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EGGS

OF

BIRDS

BREEDING IN THE NETHERLANDS

BY

A. A. VAN PELT LECHNER

Member of the Board of the „Nederlandsche Ornithologische Vereeniging"
(Netherland Ornithological Society)

With 191 plates containing 667 objects of which 617 printed in colours and 50 in collotype, taken from specimens in the author's collection.

SECOND VOLUME

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ERRATA.

In the general review of the Families Turdidae and Muscicapidae the words: „that this species originally bred in caves", used in respect of TURDUS MERULA L., should be: „that this species originally bred in holes";

and the term: „cave-breeder", used in respect of ERITHACUS RUBECULA (L.), should be: „hole-nester".

XXXIV. CICONIIDAE. Pl. 122.
XXXV. PLATALEIDAE. Plates 123—125.
XXXVI. RALLIDAE. Plates 126—130.
XXXVII. FULICIDAE. Plates 131—133.
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XXXIX. CHARADRIIDAE. } With a general view of the Family.
XL. SCOLOPACIDAE. } Plates 135—159.
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XLII. STERNIDAE. } Plates 160—180.
XLIII. ANATIDAE. With a general view of the Family. Plates 181—189.
XLIV. COLYMBIDAE. Plates 190—191.

ADDENDA AND CORRIGENDA.

ALPHABETICAL INDEXES OF THE SCIENTIFIC NAMES (I. Families. II. Genera. III. Species) AND OF THE ENGLISH NAMES OF THE SPECIES.

XXVII. Family FALCONIDAE.

Family FALCONIDAE.

(Plates 100—109).

Proper to all the genera is the short-oval or rounded-oval shape, with more or less pronounced transitions towards the spherical egg-shape; the latter occurs especially in the genera *Pernis* and *Circus*.

The texture of the shell, which is judged of according to the layer referred to below under II, is in the case of the genera *Falco* and *Cerchneis* sharply distinguished by its much finer, more uniform granulation from that of the other genera; the genus *Accipiter* approaches closest to them in this respect. *Pernis* [1]) forms as it were a transition towards *Buteo*. *Astur* exhibits in general a coarse lime-granulation, which in the case of *Circus* is slighty finer and closer, in other words: is more united.

In connection with the colour of the shell and the markings, I now give a review respecting all the genera.

[1]) REY separates (on wrong grounds, in my opinion) the genera *Pandion* and *Pernis* from one another, as layer I is coloured green by oocyanin in both genera; but in *Pandion*, firstly, the superficial colour of layer II is absent or only occurs in a slight measure, and further, the markings are never so close as in the case of *Pernis*; consequently, in the first mentioned genus the oocyanin of layer I remains better visible when light penetrates through the eggshell.

I. THE MAMMILLAE LAYER. [1])

A. Coloured *green: Accipitrinae* (genera *Circus, Astur* and *Accipiter*), *Buteo* and *Pernis*.

B. Coloured *white: Falco* and *Cerchneis*.
   1. Spotted: *Accipiter, Buteo, Pernis, Falco* and *Cerchneis*.
   2. Spotted variably: *Circus cyaneus*.
   3. Unspotted as a rule: *Circus pygargus, aeruginosus* and *Astur*.

II. THE COHERENT [2]) LIME LAYER.

A. Quite *white*: *Accipitrinae* and *Buteo*.
B. Superficially *coloured: Pernis, Falco* and *Cerchneis*.
   1. Spotted: *Accipiter, Buteo, Pernis, Falco* and *Cerchneis*.
   2. Spotted variably: *cyaneus*.
   3. Unspotted as a rule: *Circus pygargus, aeruginosus* and *Astur*.

In contrast with the oocyanin which occurs as a *calcium-compound* in layer I, the *oorhodein* is only *conglutinated* very superficially with layer II.

As regards eggs of the *Accipitrinae* and of *Buteo*, the brightness of the green colour internally, when light shines through the shell, as well as the more or less prominent occurrence externally of a sea-green colour, depend on the greater or smaller thickness of this layer; in other words: the eggs which look whitest on the outside, show through darkest green internally.

[1]) This layer is joined on the inside very closely to the outside of the uncoloured layer (impregnated with calcium-salts) of the shell-membrane.

[2]) This layer is not interrupted by openings connected with each other, as is the case with the mammillae layer.

III. THE UPPER MEMBRANE.

A thin, glutinous layer of mucus.

1. Bearing spots: *Accipiter, Buteo, Pernis, Falco* and *Cerchneis.*
2. Spotted variably: *Circus cyaneus.*
3. Unspotted as a rule: *Circus pygargus, aeruginosus* and *Astur.*

Dr. HARTERT who classified the *Falconidae* according to the yellow or green colour of the eggshell, in so doing opposed the character of a certain layer of the shell of one of the genera to that of a *different* layer of the other genera; namely, layer II of *Falco* and *Cerchneis* which is only pigmented extremely superficially by oorhodein, to layer I of the *Accipitrinae, Buteo* and *Pernis,* which is combined with oocyanin and is consequently coloured green. Dr. BALDAMUS, in his criticism [1]) of DES MURS, speaking of the „gelbrötlichweisse Färbung der Schalenmasse" in the case of the true Falcons, therefore judged of the colour of the shell as a whole according to the thin covering of pigment which is only spread over the surface of layer II (namely, of this layer solely); whilst the Oologist DES MURS, in calling the eggshell of all *Rapaces diurni* a delicate bluish [2]) white, therefore judges of the eggshell as a whole according to layer II after the removal (namely in the case of *Pernis, Falco* and *Cerchneis)* of the aforesaid covering of oorhodein. The above would appear to me to be incorrect.

The data which I have obtained and which are given in the

[1]) Journal für Ornithologie, 1860 (pages 359 *et seq.*).

[2]) Traité général d'Oologie ornithologique au point de vue de la classification, p. 205.

I have never seen this bluish colour in layer II of eggshells of the genera *Falco* or *Cerchneis*; I have seen it in the other genera, where it (namely, if this layer is not particularly thick, which is sometimes the case) is caused by the oocyanin of layer I showing through.

foregoing review of the layers of the eggshell, furnish us with the distinguishing features for a classification of the *Falconidae*, breeding in the Netherlands into three oological groups, as follows:

a. Layer I = green
Layer II = white
} *Accipitrinae* and *Buteo.*

b. Layer I = green
Layer II = white, coloured superficially
} *Pernis.*

c. Layer I = white
Layer II = white, coloured superficially
} *Falco* and *Cerchneis.*

If we now regard the character of the colouring and markings of the eggs more closely, it will be noticed at once that in the case of the eggs of *Pernis*, *Falco* and *Cerchneis* this character although not fully corresponding, may nevertheless be jointly placed over against the character of the eggs of the *Accipitrinae* and *Buteo*. I do not however wish to omit reference here to the fact that in *Accipiter*, which genus, as stated above, stands as regards texture of shell nearest to *Falco* and *Cerchneis*, the markings frequently bear the character of that genera more than they do that of *Buteo* [1]), which fact would be still more striking if the surface of layer II of *Accipiter* were also coloured.

Where markings occurred in *Circus* I found them on *all* the layers fully in conformity as regards their nature with those which occur on layer II in *Buteo*, namely spots of a faint brownish yellow colour, caused, in my opinion, by oorhodein bleached by glutinous mucus.

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[1]) RZEHAK rightly says in his characteristics of *nisus*-eggs, which is otherwise not quite correct (Zeitschrift für Oölogie, V, p. 47): „Manche Eier sind mit einer lichtbraunen Farbe so gezeichnet, dass sie beim ersten Blick für *tinnunculus*-Eier gehalten werden können."

A few additional specific characteristics.

CIRCUS CYANEUS (L.).

Proportionately more spotted eggs are found among those of *cyaneus* than among those of the other species.

VON RIESENTHAL observed that in some years spotted eggs occur more numerously than in other years.

Red and *rusty-red* spots, which REY mentions, are in my opinion frequently caused by nest-materials, as is also the case, e. g. with eggs of the *Colymbidae*. (See also below at *aeruginosus*). The spotted eggs, shown in DRESSER'S [1]) Work under 4 and 6 on plate I (part I, page 7) remind one of sparsely spotted eggs of *Accipiter nisus*.

CIRCUS PYGARGUS (L.).

These eggs, whose shape often reminds one of eggs of *Strigidae*, are as a rule smaller than those of *cyaneus* and are spotted much more rarely. VON RIESENTHAL had never seen spotted eggs; if markings occur these, REY says, are much fainter than in the case of *cyaneus*.

CIRCUS AERUGINOSUS (L.).

Layer II of these eggs is usually so thick that the oocyanin of layer I only rarely gives any tint to the surface of the shell; occasionally this surface exhibits a few accessory spots caused by nest-dirt.

Neither ALTUM, VON RIESENTHAL, nor REY make mention of real pigment markings. Yet these seem to occur occasionally; but in order to show how rarely they occur, I quote what Mr. W. SCHLUTER,

[1]) Eggs of the Birds of Europe. London, 1905—'10.

of Halle a. S., an Oologist of great experience, kindly stated to me recently: „Von *Circus aeruginosus* kommen allerdings einzelne Eier mit rötlichen Pigment-Flecken vor, indes nur überaus selten, ich möchte sagen unter 100 Gelegen befindet sich erst einmal 1 Ei, resp. 1 Gelege, welches diese seltene Färbung aufweist."

As regards this species, *accessory* spots have, no doubt, hitherto frequently been taken for pigmentary spots.

ASTUR PALUMBARIUS (L.).

Eggs with *red-brown* pigment spots situated at the surface (in layer III) are *as rare* as they are in *Circus aeruginosus*, as Mr. SCHLÜTER informed me. VON PETÉNYI says of the spots of *palumbarius*-eggs: „ . . . . sind bloss durch die schmutzigen Füsse oder durch die frischen, als Unterlage dienenden, beblätterten Zweige dem noch weichen, frischgelegten Eie (read: the still damp upper membrane) eingedrückt, also bloss zufällig, weshalb sie meist auf der bauchigen Mitte der Eier vorkommen". This can of course only relate to spots in layer III (= upper membrane); from REY's description however, it appears indisputably that this author has seen eggs exhibiting small light havana-brown spots on layers I and II, mentioned by me in respect of *Circus cyaneus* and *Circus pypargus*.

The greyish or yellowish *cloudy markings*, which REY speaks of, I hold to be locally thickened portions of the upper membrane (layer III); I have seen eggs of which this membrane seemed to me to be mixed with a very much *diluted* quantity of oorhodein, and to be coloured a very light yellow by it.

Otherwise, I regard what has been said above respecting accessory and pigment spots in the case of *Circus aeruginosus*, to apply equally here.

DRESSER'S opinion [1]) that spots which *cannot be washed off* are *pigment* spots, I do not share, as it is quite possible for substances originating from nest-material etc. to penetrate *into* the eggshell and for it to be impossible to remove the same.

The so-called *„grease-spots"* („Oeltropfenflecke" of German writers) which Dr. R. Baron VON KÖNIG—WARTHAUSEN [2]) takes to be „stellenweise Steigerung des Grundtons", therefore a local accumulation of oocyanin in layer I, or a diminution of carbonate of lime in layer II, appear to me, on examination, to be attributable to a local accumulation of glutinous substance in layer I.

ACCIPITER NISUS (L.).

The very variable markings of these eggs consist either of a few, frequently large, spots, forming an irregular zone low down on the basal end or near the bellied portion of the eggshell, or of clouds and smears covering almost the whole surface, often accompanied by coarser or finer specks and veins.

As a striking peculiarity of *nisus*-eggs, I find it stated that one side of them is sometimes marked very strongly, the other side, on the other hand, being marked particularly little. This phenomenon I have however found to be one of *general* occurrence in the case of *irregularly spotted* eggs.

I am able to confirm from my own experience that the eggs which are laid last are coloured sea green more strongly than the other eggs, and sometimes exhibit lighter tinted spots; and R. KEARTON also says to have observed that of sets of six eggs the markings of two are always fainter than those of the other four eggs.

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[1]) L. c., parts III—IV, page 69.

[2]) Ueber die zur Unterscheidung der Vogeleier dienenden Merkmale (Würtemb. naturw. Jahreshefte, 1876.)

Of some eggs the markings bear the character proper to beautifully marked *buteo*-eggs, namely underlying and superficial spots, each shading from dark to a lighter tint, wound mostly in a right-handed spiral.

RZEHAK mentions in his description of the characterizing features of *nisus*-eggs: „mit violettgrauen Schalenflecken (read: underlying [brown] spots which show through violet grey), *welche keinem Ei fehlen*". That every *nisus*-egg bears spots on layer I is certain but if the said writer meant to assert — as I suspect he did — that these spots are *visible* on every egg, his assertion is not correct; they frequently cannot be seen: this depends wholly on the greater or smaller thickness of layer II.

I do not wish to omit mention of the fact that VON RIESENTHAL[1]) saw at Chief-Forester WIESE'S in Greifswald, a very interesting, *brownish* coloured variety of *nisus*-egg; of this egg, therefore, as in the case of the genera *Falco* and *Cerchneis*, layer II must have been covered by a diluted quantity of oorhodein.

MORRIS mentions a set which consisted of 5 *plain white* eggs; in these eggs, therefore, the spots on layer II, and certainly those on layer III, were probably absent.

MR. E DETMERS (Lingen on Ems, province of Hanover), with whom I entered into correspondence in reference to an article [2]) which he had published, informed me (in a letter of August 29, 1906) that in regard to *Accipiter nisus* he had found from experience that the *larger* the number of eggs of a set is and the *darker* the

[1]) O. VON RIESENTHAL, Die Raubvögel Deutschlands (Cassel, 1876) p. 59, footnote.

[2]) Buteo buteo, Astur palumbarius, Accipiter nisus et Syrnium aluco (In: Zeitschr. f. Oologie und Ornithologie, XVI, p. 76).

eggs are marked, the *rounder* their shape is; and as he had also observed, corresponding with what HENNICKE[1]) had noticed in respect of Birds of Prey kept in confinement, that the sets laid by *young* female birds are *smaller* in number and are marked in a *lighter* tint than those laid by old ones, MR. DETMERS infers that sets of *round* eggs are laid by *old* female birds.

In the *nisus*-sets in my collection I can observe *no* connection between size, intensity of the colour of the spots, and more or less spherical shape.

BUTEO BUTEO (L.).

In general *buteo*-eggs are characterized by spots or clusters of spots, each shading from a dark to a lighter tint in the direction leading from the big end to the pointed end, and either in the longitudinal axis of the egg, or winding — mostly in a right-handed spiral — round it. Eggs of which layer II bears bright brown spots, and layer III contains but very little lime, exhibit a fine reddish lilac tint.

In NAUMANN it is stated that the nest sometimes contains one egg which is either wholly unmarked or is marked extremely little, and that it is still uncertain at what age female birds lay such eggs, while of the sets which are largest in number the eggs are also marked most strongly and are largest in size. MORRIS [2]) mentions a case in which the sets, which were said to be of one and the same female bird, increased in intensity of colouring from year to

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[1]) See: C. R. HENNICKE, Die Raubvögel Mitteleuropas (Gera, 1903) and E. DETMERS, Fortpflanzung der Raubvögel in der Gefangenschaft. (Verlag F. Pfenningstorff, Berlin).

[2]) A natural history of the Nests and Eggs of British Birds (London, 1864—65).

year until they had gradually passed from almost plain white to eggs with dark brown markings [1]).

On comparing the stage of development of the embryos of one nest, it appeared to ALTUM [2]) that the most strongly marked eggs were laid first.

FALCO SUBBUTEO L.

In general these eggs are, as compared with *tinnunculus*-eggs, distinguished by a smaller intensity of the brown colour, which is more yellowish; further, by a fine, close marking which almost always completely covers the ground; and finally, by a slightly more elongated shape. The determination is very much facilitated when one has the whole set before one.

As KLEINSCHMIDT [3]) says, it is mostly the incubated, weakly coloured eggs, and eggs of after-sets of *tinnunculus*, which are often taken to be *subbuteo*-eggs.

Observations made by GANSKE [4]) in a certain area during many years indicate that the smaller pale pink or bright red eggs are laid by *young* female birds, and are most probably their very first set.

CERCHNEIS TINNUNCULUS (L.).

The markings consist mostly of large, usually rather sharply outlined spots and smears; frequently, however, they only consist of many small specks.

The *pitch-black* spots on some eggs I consider to be identical

[1]) See also: „Einzeleier vom Mäusebussard", von Dr. R. Thielemann (Zeitschr. f. Ool. u. Ornith., XV. Jahrg., p. 86), who is inclined to consider clutches consisting of one egg as indications of the end of the production period.

[2]) Die Eier von *Buteo vulgaris*. (Journal f. Ornith. 1863; id. 1864).

[3]) Zeitschr. f. Oologie, III, p. 14 and 15.

[4]) Zeitschr. f Oologie, III, p. 33.

with those which are often found on eggs of *Corvus*-species, and which probably consist of *bilihumin*, a black, insoluble, very strongly oxidized substance. [1])

In *tinnunculus* as well as in *subbuteo* striking mutual differences in colour and markings occur between eggs of one and the same set.

[1]) See: Dr. A. A. Mc. ALDOWIE, Observations on the development and the decay of the pigment layer on bird's eggs. (The Journal of anatomy and physiology, Vol. XX, 1886).

Family FALCONIDAE.

Circus cyaneus (L.) — Hen-Harrier.

(Plate 100, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 63, No. 151).

Colour of surface of shell:	white, with a more or less bluish sea-green tinge; when light shines through the egg-shell it shows through green.
Colour of spots:	havana-brown (light greenish yellow, according to VON RIESENTHAL).
Average dimensions:	44.7 × 34.9 millimetres.
Average weight of shell:	2.4 grams
Texture of shell:	fine-grained.
Shape:	mostly rounded; sometimes oblong-ovoidal.
Nest:	consists of vegetable materials, sometimes lined with hair and feathers.
Site of nest:	on the ground in cornfields and grass-land; also sometimes on dry spots in bogs.
Number of eggs:	4—5, sometimes 6.
Breeding season:	May—June.
Duration of incubation:	about 3 weeks.

Family FALCONIDAE.

Circus pygargus (L.) — Montagu's Harrier.

(Plate 101, fig. a-b).

(Snouckaert: Avifauna Neerlandica, p. 64, No. 152).

Colour of surface of shell:	white, with a more or less bluish, sea-green tinge; when light shines through the egg-shell it shows through green.
Colour of spots:	light havana-brown.
Average dimensions:	40.6 × 32.4 millimetres.
Average weight of shell:	2 grams.
Texture of shell:	fine-grained.
Shape:	short-oval.
Nest:	consists of vegetable materials, sometimes lined with hair and wool. In July 1899 a nest was found near Steenwijkerwolde which had a couple of side-nests in each of which there was a young bird. [1])
Site of nest:	on the ground. in corn-fields, tall grass, shrubs, etc.; by preference more in dry regions (on heaths and in the dunes).
Number of eggs:	4—5, sometimes 6.
Breeding season:	May—June.
Duration of incubation:	about 3 weeks.

[1]) Statement by Dr. C. KERBERT in the „Ornithologisch Jaaroverzicht" of Dr. R. Baron SNOUCKAERT VAN SCHAUBURG, in: „De Levende Natuur", 5th annual series, page 98.

Family FALCONIDAE.

Circus aeruginosus (L). — Marsh-Harrier.

(Plate 102, fig. a—c).

(Snouckaert: Avifauna Neerlandica, p. 65, No. 154).

Colour of surface of shell:	white, tinged more or less bluish sea-green when light shines through the eggshell it shows through green.
Colour of spots (if any):	light havana-brown.
Average dimensions:	48.6 × 37.9 millimetres.
Average weight of shell:	3.16 grams.
Texture of shell:	finer grained than that of *A. palumbarius*.
Shape:	mostly bellied-spherical.
Nest:	consists of vegetable materials, lined with a few feathers. (Also sometimes takes possession of nests of *Fulica atra*).
Site of nest:	in tall reeds on old stubbles; on overhanging willow bushes, etc., in bogs with a dense growth of shrubs.
Number of eggs:	4—6, usually 5 (after-set 3—4).
Breeding season:	May—June.
Duration of incubation:	about 3 weeks.

Family FALCONIDAE.

Astur palumbarius (L.) — Goshawk.

(Plate 103, fig. a—b).

(Snouckaert: Avifauna Neerlandica, p. 65, No. 155).

Colour of surface of shell:	white, tinged more or less bluish sea-green; when light shines through the eggshell it shows through dark green.
Average dimensions:	57.4 × 44.8 millimetres.
Average weight of shell:	6.1 grams.
Texture of shell:	coarse-grained.
Shape:	mostly about ovoidal; often bellied.
Nest:	consists of vegetable materials (also occupies nests of other species of Birds of Prey).
Site of nest:	in lofty trees, by preference in oaks, beeches or firs.
Number of eggs:	2—4, sometimes 5, usually 3.
Breeding season:	April—beginning of June.
Duration of incubation:	about 3 weeks.

Family FALCONIDAE.

Accipiter nisus (L.) — Sparrow-Hawk.

(Plate 104, fig. a-d).

(Snouckaert: Avifauna Neerlandica, p. 66, No. 156).

Colour of surface of shell:	white, tinged more or less bluish or sea-greenish.
Colour of spots:	rusty brown; dark red-brown; underlying spots show through violet-grey; when light shines through the eggshell it shows through dark green.
Average dimensions:	39.8 × 32.4 millimetres.
Average weight of shell:	1.78 gram.
Texture of shell:	fine-grained.
Shape:	mostly rounded or bellied.
Nest:	consists of vegetable materials. (Nests of other species of birds are also used).
Site of nest:	by preferenee in coniferous trees.
Number of eggs:	4—6, sometimes 7, usually 5.
Breeding season:	May—June.
Duration of incubation:	about 3 weeks.

Family FALCONIDAE.

Buteo buteo (L.) — Common Buzzard.

(Plate 105, fig. a-b).

(Snouckaert: Avifauna Neerlandica, p. 66. No. 157).

Colour of surface of shell:	white, tinged more or less seagreen; when light shines through the eggshell it shows through green.
Colour of spots:	loam-brown; red brown; underlying spots show through violet.
Average dimensions:	55 × 44 millimetres.
Average weight of shell:	4.7 grams.
Texture of shell:	rather fine grained; numerous sharp-pointed pores.
Shape:	short-oval, bellied.
Nest:	consists of vegetable materials. (Old nests of *Corvidae* are also used as a substructure).
Site of nest:	by preference in oaks and beeches; also in tall firs (Leuvenumsche Bosch, 1899) [1].
Number of eggs:	2—4, usually 3.
Breeding season:	April—May.
Duration of incubation:	about 4 weeks.

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[1]) Statement by Dr. C. KERBERT, in the „Ornithologische Jaaroverzicht", by Dr. R. Baron SNOUCKAERT VAN SCHAUBURG, in „De Levende Natuur", 5th annual series, page 98.

Family FALCONIDAE.

Pernis apivorus (L). — Honey-Buzzard.

(Plate 106, fig. a-b).

(Snouckaert: Avifauna Neerlandica, p. 71, No. 168).

Colour of surface of shell:	white, sometimes slightly yellowish or greenish; when light shines through the eggshell it shows through more or less yellowish green. The cloudy markings are so close that frequently nothing is visible of the colour of the surface of the shell.
Colour of spots:	dark red-brown. Usually, every set of eggs consists of one egg coloured almost plain, and of one irregularly marked egg.
Average dimensions:	51.8 × 41.6 millimetres.
Average weight of shell:	3.6 grams.
Texture of shell:	fine-grained.
Shape:	bellied; often approaches strongly to a spherical shape.
Nest:	consists of vegetable materials. (Deserted nests of other species of Birds of Prey, or nests of *Corvidae*, are also sometimes used as a substructure).
Site of nest:	by preference in leaf-trees, particularly in beeches and oaks.
Number of eggs:	2; sets of three eggs have once or twice been found, constituting rare exceptions.
Breeding season:	May—June.
Duration of incubation:	presumably about 3 weeks.

Family FALCONIDAE.

Falco subbuteo L. — Hobby.

(Plate 107, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 73, No. 173).

Colour of surface of shell:	faint yellowish brown.
Colour of spots:	deep yellowish brown, in various shades; when light shines through the eggshell it shows through yellowish white.
Average dimensions:	41.2 × 33.3 millimetres.
Average weight of shell:	1.98 gram.
Texture of shell:	as is also the case with *C. tinnunculus,* the texture is still finer and more uniformly grained than that of the other genera.
Shape:	mostly bellied, short ovoidal.
Nest:	consists of vegetable materials, lined with hair, wool and feathers. (Uses *Corvidae*-or other nests by preference).
Site of nest:	in the tops of lofty trees, especially in fir-trees.
Number of eggs:	3—4.
Breeding season:	June--July.
Duration of incubation:	about 3 weeks.

Family FALCONIDAE.

Cerchneis tinnunculus (L.) — Kestrel.

(Plates 108 and 109, fig. a-f).

(Snouckaert: Avifauna Neerlandica, p. 75, No. 176).

Colour of surface of shell:	loam-coloured, varying up to rusty red; rarely a decided white; when light shines through the eggshell it shows through yellowish white.
Colour of spots:	yellowish brown, varying up to dark rusty brown.
Average dimensions:	38.6 × 30.55 millimetres.
Average weight of shell:	1.5 gram.
Texture of shell:	as is also the case with *F. subbuteo*, the texture is still finer and more uniformly grained than that of the other genera.
Shape:	variable.
Nest:	consists of vegetable materials, lined with feathers and hair. (*Corvidae*-nests are also used).
Site of nest:	in trees, at different heights, also in low pollard willows; in towers, and on and in all sorts of buildings; in cracks, holes, etc. in walls; also in holes in trees.
Number of eggs:	5—6, sometimes 7 (after-set 3-4).
Breeding season:	April—June.
Duration of incubation:	about 3 weeks.

Fam. FALCONIDAE.

a b c

Circus cyaneus (L.)

Fam. FALCONIDAE.

a

b

Circus pygargus (L.)

Fam. FALCONIDAE.

a b

c

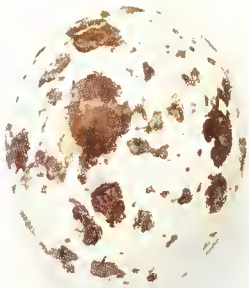
Circus aeruginosus (L.)

a b

Astur palumbarius (L.)

Fam. FALCONIDAE.

a



b

c

d

Accipiter nisus (L.)

a

b

Buteo buteo (L.)

Fam. FALCONIDAE.

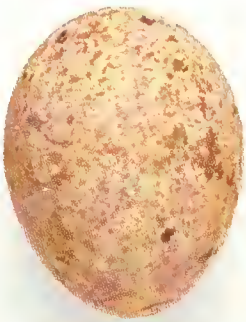
a

b

Pernis apivorus (L.)

Fam. FALCONIDAE.

a



b

c

Falco subbuteo L.

Fam. FALCONIDAE.

a

b

c

Cerchneis tinnunculus (L.)

Fam. FALCONIDAE.

d

c

f

Cerchneis tinnunculus (L.)

XXVIII. Family COLUMBIDAE.

Family COLUMBIDAE.

Columba oenas L. — Stock-Dove.

(Plate 110, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 76, No. 179).

Colour of surface of shell:	white, often tinged a delicate cream-colour.
Average dimensions:	37 × 28 millimetres.
Average weight of shell:	1.1 gram.
Texture of shell:	not specially characterized. [1]
Shape:	mostly short-oval.
Nest:	consists of dry twigs, roots and leaves, sometimes also of moss.
Site of nest:	in hollow trees and rabbit-burrows; also in shrubs, and in dense vegetation on or immediately above the ground.
Number of eggs:	2 (as a rare exception 3).
Breeding season:	April—October.
Duration of incubation:	about 17 days.

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[1]) The internal structure, i. e. that of the underlying layers of the shell, differs in the *Columbidae* from, e. g., that of the Families belonging to the *Oscines*. See on this subject: W. VON NATHUSIUS, Abgrenzung der Ordnung der *Oscinen* von den *Clamatoren, Scansoren* und *Columbiden* durch die Structur der Eischalen.

Family COLUMBIDAE.

Columba palumbus L. — Ring-Dove.

(Plate 111, fig. a—c).

(Snouckaert: Avifauna Neerlandica, p. 76, No. 178).

Colour of surface of shell:	white.
Average dimensions:	40 × 29 millimetres.
Average weight of shell:	1.31 gram.
Texture of shell:	not specially characterized.
Shape:	mostly oblong-oval.
Nest:	consists of dry twigs and roots.
Site of nest:	in all sorts of trees at very variable heights; also sometimes in Hawthorn bushes; further, in deserted *Corvidae*-nests and Squirrels' dreys.
Number of eggs:	2 eggs.
Breeding season:	April—October.
Duration of incubation:	about 17 days.

Family COLUMBIDAE.

Turtur turtur (L.) — Turtle-Dove.

(Plate 112, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 76, No. 180).

Colour of surface of shell:	white.
Average dimensions:	30 × 22.5 millimetres
Average weight of shell:	0.52 gram.
Texture of shell:	not specially characterized.
Shape:	mostly short-oval.
Nest:	consists of fine dry twigs and stalks.
Site of nest:	in various trees, and in thick bushes.
Number of eggs:	2 eggs.
Breeding season:	May—June.
Duration of incubation:	about 16 days.

Fam. COLUMBIDAE.

a

b

c

Columba oenas L.

Fam. COLUMBIDAE.

a

b

c

Columba palumbus L.

Fam. COLUMBIDAE.

a

b

c

Turtur turtur (L.)

XXIX. Family PHASIANIDAE.

XXX. „ PERDICIDAE.

XXXI. „ TETRAONIDAE.

Families PHASIANIDAE, PERDICIDAE and TETRAONIDAE.

(Plates 113—116).

Of the *Perdicidae*, breeding in the Netherlands, *P. perdix* stands through internal and external oological distinguishing features side by side with *Ph. colchicus*.

C. coturnix, although having its fundamental layer — tinged a pale bluish green by oocyanin — in common with *colchicus* and *perdix*, approaches through external oological properties closer to *T. tetrix*. A special characteristic, peculiar to the *coturnix*-egg as well as to that of *tetrix*, consists in the circumstance that in both eggs the surface pigment layer and the spots are completely *mingled*, as it were, with glutinous substance, and are only attached extremely loosely to the shell.

My examination further showed to me:

1. that in the *coturnix*-eggshell, between the surface layer of pigment mixed with gluten and the fundamental oocyanin layer, there is an unspotted layer, coloured yellowish or greyish brown which fully corresponds with the surface pigment layer of the *perdix*-eggtypes.

2. that in the *tetrix*-eggshell *all* the lime layers under the surface pigment layer are *pure white* (contain no oocyanin) down to

the inner membrane, so that bluish (cyanic) aberrations, such as in *colchicus* and *perdix*, need not be expected here, as, as far as I am aware, these only occur in those species in which the fundamental layer of the shell normally contains oocyanin.

Family PHASIANIDAE.

Phasianus colchicus L. — Pheasant.

(Plate 113, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 78, No. 182).

Colour of surface of shell:	greyish olive-green; olive-yellow or olive-brown.
Average dimensions:	45.15 × 35.55 millimetres.
Average weight of shell:	2.91 grams.
Texture of shell:	smooth, with clearly visible pores.
Shape:	ovoidal.
Nest:	composed of vegetable materials.
Site of nest:	in a shallow hollow in the ground; in long grass; in clover and corn-fields; under shrubs, etc.
Number of eggs:	8—12 (sometimes more).
Breeding season:	beginning of April (sometimes end of March) — end of June (sometimes till the beginning of August).
Duration of incubation:	about 25 days.

Family PERDICIDAE.

Perdix perdix (L.) — Common Partridge.

(Plate 114, fig. a–c).

(Snouckaert: Avifauna Neerlandica, p. 78, No. 183).

Colour of surface of shell:	yellowish, yellowish green, greyish green, or brownish.
Average dimensions:	35 × 26.5 millimetres.
Average weight of shell:	1.43 gram.
Texture of shell:	smooth, with many clearly visible pores.
Shape:	more or less pyriform.
Nest:	composed of vegetable materials.
Site of nest:	in a little hollow in the ground, in long grass; in clover and corn-fields, etc., on the sides of ditches; also among the trees on the edges of woods; among sand-elymus, heather, etc.
Number of eggs:	10—16 (sometimes more).
Breeding season:	May — beginning of July.
Duration of incubation:	about 21 days.
Remarks:	Brownish specks or small spots sometimes occur, in which connection I point out here, that in the allied genus *Caccabis* the eggs are normally spotted with yellowish or reddish brown.

Family PERDICIDAE.

Coturnix coturnix (L.) — Quail.

(Plate 115, fig. a-d).

(Snouckaert: Avifauna Neerlandica, p. 79, No. 185).

Colour of surface of shell:	greyish or brownish yellow; olive-yellow or brown, sometimes covered as it were with a whitish dew.
Colour of spots:	dark brown; black. If the spots have hardened, they mostly exhibit „cracks", or only the circular rims of the spots remain, within which the yellow ground colour has also come off, in consequence of which black-rimmed white spots have arisen.
Average dimensions:	29.6 × 22.8 millimetres.
Average weight of shell:	0.76 gram.
Texture of shell:	very finely granulated; pores pigmented.
Shape:	more or less pyriform; short-compressed.
Nest:	composed of vegetable materials.
Site of nest:	in a little hollow in the ground in arable land and in clover-fields.
Number of eggs:	8—14.
Breeding season:	June (sometimes end of May), July, August.
Duration of incubation:	about 20 days.

Family TETRAONIDAE.

Lyrurus tetrix (L.) — Black Grouse.

(Plate 116, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 79, No 186).

Colour of surface of shell:	yellowish, tinged with brown or red.
Colour of spots:	rusty brown.
Average dimensions:	49.7 × 36.1 millimetres.
Average weight of shell:	2.38 grams.
Texture of shell:	smooth, with many well visible pores.
Shape:	oblong ovoidal.
Nest:	consists of a little dry grass and leaves, as a bedding for the clutch.
Site of nest:	in a little hollow in the ground among long grass, heather, low shrubs, among young firs, etc.
Number of eggs:	6—12 (sometimes more).
Breeding season	May, June.
Duration of Incubation:	about 27 days.

Fam. PHASIANIDAE.

a b c

Phasianus colchicus L.

Fam. PERDICIDAE.

a

b

c

Perdix perdix (L.)

Fam. PERDICIDAE.

a

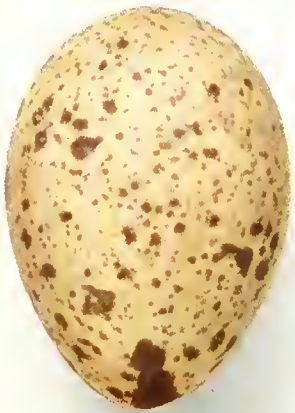
b

c

d

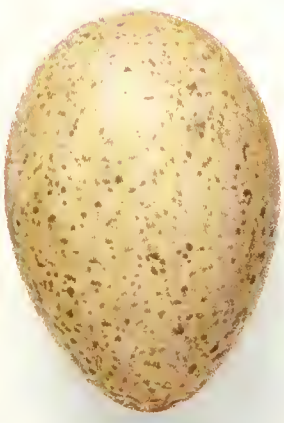
Coturnix coturnix (L.)

Fam. TETRAONIDAE.



a

b



c

Lyrurus tetrix (L.)

XXXII. Family PELECANIDAE.

Family PELECANIDAE.

Phalacrocorax carbo (L.) — Common Cormorant.

(Plate 117, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 80, No. 188).

Colour of surface of shell:	pale greenish blue, completely or partly covered with a white or yellowish white lime-crust *), more or less browned by accessory spots caused by nest-material; when light penetrates through the shell it shows through green in the same shade as, e. g., in eggs of the *Colymbidae*. *In the shell (under the lime-crust) I have sometimes found green spots, corresponding in shade with the biliprasin of* Ardea-*eggs.*
Average dimensions:	65 × 40 millimetres.
Average weight of shell:	5.5 grams.
Texture of shell:	the shell (under the lime-crust) appears to me to be more or less allied in texture, shape of the pores, and through the occasional occurrence of long grooves, with that of *Ardeidae*.
Shape:	mostly elliptical; sometimes ovoidal, bluntly pointed.
Nest:	composed of sticks, stalks, rushes, sea-weed, and similar materials.
Site of nest:	in high trees as well on pollard willows or among rushes, according to local conditions; always in large or small colonies.
Number of eggs:	3—5.
Breeding season:	mid-March (still earlier when the weather is favourable) till in August (sometimes September).
Duration of incubation:	about 28 days.
*** Remark:**	on analyzing this crust chemically, it was seen to have, in the main, the same composition as the eggshell.

XXXIII. Family ARDEIDAE.

Family ARDEIDAE.

(Plates 118—121).

The characteristic points of difference between eggs of *Ardea purpurea L.* and *A. cinerea L.* consist in the facts that:

1° in *A. purpurea* a thin layer of lime is spread, as is it were like a continuous veil, over the uppermost pigment layer, while in *A. cinerea* numerous separate particles of lime form so many scattered white specks;

2° the pigment layer mentioned under 1°, superposed in both species on the deeper layers — coloured blue by oocyanin —, also contains a green pigment (biliprasin) [1]) which occurs as a rule in a much stronger measure in *A. cinerea* than in *A. purpurea.*

For *cinerea*-eggs that are pigmented green in a weaker degree, as well as for *purpurea*-eggs that are coloured green in a stronger degree than is usually the case, the distinguishing feature mentioned under 1° obtains undiminished.

As it appeared that the true nature of the large white and yellowish spots which occur so frequently, e. g. on eggs of *Ardea*-species, had never been examined before, Mr. J. H. ABERSON, Instructor in Chemistry at the State High Agricultural, Horticultural

[1]) Found by KRUKENBERG in the eggshells of, among others, *Corvinae, Turdinae,* and *Ardeinae.* (See his „Farbstoffe der Vogeleierschalen", in: Verhandl. der phys. med. Gesellsch. N. F. Bd. XVII, p. 117).

and Forestry School at Wageningen, very kindly undertook to chemically analyze them, for which I hereby once more express my cordial thanks to him.

The results of this analysis showed that the said spots on *cinerea*- and *purpurea*-eggs are composed of a very small quantity of calcium carbonate, mainly however of uric acid mingled with sodium urate and probably also with ammonium urate; that, therefore, they are analogous in composition to the white constituents of bird-excrements.

If, on the egg leaving the uterus, uratic compounds are passed in consequence of pressure on the rectum, or if in the somewhat bellmouthed rim of the cloaco and perhaps also on the feathers round the anal opening faeces or rests thereof remain, the surface of the shell is more or less besmeared with it.

About the possible occurrence of pigment spots in *Ardea*-species, among others, Dr. E. Rey wrote to me as follows (in a letter of April 22, 1908): —

„Bei den *Ardea*-Arten ist mir bisher eine wirkliche Pigmentierung „noch nicht vorgekommen, obgleich mir viele Tausende durch die „Hände gegangen sind. Unmöglich ist es aber natürlich nicht, dass „auch einmal bei *Ardea* (oder *Botaurus*) gefleckte Eier vorkommen „können, da ja doch *Platalea* gefleckte Eier legt. Was ich von „Flecken bei Reihereiern bisher sah waren Blutflecken, die wie „Rostflecke aussahen und nie gleichmässig vertheilt auftraten, son„dern an irgend einer Stelle eine kleinere oder grössere Gruppe „bildeten".

ARDEA CINEREA L.

Nozeman, who describes these eggs as being marked with a few

grey specks (on the plate they are even *spots*) of course took accessory specks to be pigment specks.

According to ICKERT [1]) the earliest clutches of older birds and the eggs of those of younger birds are distinguished by a greater size (about 1 centimetre) and a less pure bluish green colour; elongated biconical eggs found in April are said to be after-sets of older female birds.

BOTAURUS STELLARIS (L.).

In the *stellaris*-eggshell, all lime layers underlying the surface pigment layer, are tinged with bluish green by oocyanin; the glutinous (uppermost) layer modifies the shade of the surface colour considerably, and the latter is only visible here and there in little patches that are devoid of gluten.

E. W. WADE states [2]) to have found two clutches in Holland, respecting which he says: „In two clutches we saw, the eggs were „marked, the one with small reddish-brown speckles, generally „more numerous about the large end, the other with dull spots and „blotches of olive-brown, especially marked about the ends of two „of the eggs".

It is not excluded, I think, that in the one case these may have been blood-spots, and, in the other, accidental local concretions of surface pigment (i. e. pigment not distributed evenly), therefore in neither of the two cases spots in the ordinary sense of the word. For the rest, I refer to Dr. REY's letter quoted above under *Ardea cinerea*.

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[1]) Zeitschr. f. Ool. (Hocke) 6. Jahrg., p. 10-11.
[2]) „British Birds", Vol. I, p. 334.

Family ARDEIDAE.

Ardea purpurea L. — Purple Heron.

(Plate 118, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 81, No. 191).

Colour of surface of shell:	pale greenish blue; *completely* covered with a very thin layer of lime. (See introduction of the Family).
Average dimensions:	57.6 × 40.9 millimetres.
Average weight of shell:	3.57 grams.
Texture of shell:	usually slightly less smoothly granulated (the constituent grains are mutually slightly more distinctly distinguishable) than in *cinerea*; in the surface of the shell there are often more or less long grooves; the clearly visible pores are often joined together in long rows.
Shape:	as a rule ovoidal.
Nest:	composed of dry reedstems, sticks, rushes and blades of Gramineae.
Site of nest:	in thick growths of reeds, at a height of about 1 Metre on stems that are bent down; also on low water-willows up to about 3 Metres from the ground (in large or small colonies).
Number of eggs:	4—5, usually 5, only in exceptional cases more. [1]
Breeding season:	May.
Duration of incubation:	about 28 days.

[1] JOURDAIN alleges, wrongly, that in Holland the clutch *frequently* comprises 6 eggs.

Family ARDEIDAE.

Ardea cinerea L. — Common Heron.

(Plates 119, fig. a-d).

(Snouckaert: Avifauna Neerlandica, p. 82, No. 192).

Colour of surface of shell:	bluish green; flaky particles of lime are spread over the entire surface, in consequence of which the pores often resemble white specks. (See introduction of the Family).
Average dimensions:	61 × 43 millimetres.
Average weight of shell:	4.6 grams.
Texture of shell:	smoothly granulated (the constituent grains are difficult to distinguish from one another.
Shape:	ovoidal, more oval or bellied.
Nest:	composed of twigs, reedstems, etc., lined mostly with hair, wool and feathers.
Site of nest:	usually in the tops of high trees, but also in growths of reeds (in colonies).
Number of eggs:	4—6.
Breeding season:	March (in a few nests eggs are sometimes found even earlier) — April, also sometimes even in May.
Duration of incubation:	about 28 days.

Family ARDEIDAE.

Ardetta minuta (L.) — Little Bittern.

(Plate 120, fig. a—d).

(Snouckaert: Avifauna Neerlandica, p. 84, No. 197).

Colour of surface of shell:	white, in which in fresh eggs an extremely light bluish or bluish green shade is discernible.
Average dimensions:	35 × 25.9 millimetres.
Average weight of shell:	0.68 gram.
Texture of shell:	smoothly granulated.
Shape:	ovoidal or oval; often slightly pointed at the large end.
Nest:	composed of willow twigs, rushes and blades of Gramineae.
Site of nest:	above the water on bent blades of reeds; also between reeds and growths of weeds on the top of a willow-stump or alder-stump at 1—1½ foot above the ground or marsh.
Number of eggs:	5—6 (sometimes more).
Breeding season:	June—July.
Duration of incubation:	about 17 days.

Family ARDEIDAE.

Botaurus stellaris (L.) — Common Bittern.

(Plate 121, fig. a—c).

(Snouckaert: Avifauna Neerlandica, p. 84, No. 198).

Colour of surface of shell:	olive-brown.
Average dimensions:	53.6 × 38.3 millimetres.
Average weight of shell:	2.69 grams.
Texture of shell:	smoothly granulated, with numerous pores; often exhibits many long grooves.
Shape:	mostly short-ovoidal, also sometimes oval or bellied.
Nest:	composed of dry reed-stems, rushes and stalks of Gramineae.
Site of nest:	in dense reed vegetation, on procumbent stems of previous years.
Number of eggs:	5—6 (in exceptional cases more).
Breeding season:	May (sometimes end of April) — June.
Duration of incubation:	about 25 days.

Fam. ARDEIDAE.

a

b

c

Ardea purpurea L.

Fam. ARDEIDAE.

a

b

c

d

Ardea cinerea L.

Fam. ARDEIDAE.

a

b

c

d

Ardetta minuta (L.)

Fam. ARDEIDAE.

a

b

c

Botaurus stellaris (L.)

XXXIV. Family CICONIIDAE.

Family CICONIIDAE.

Ciconia ciconia (L.) — White Stork.

(Plate 122, fig. a—b).

(Snouckaert: Avifauna Neerlandica, p. 85, No. 199).

Colour of surface of shell:	white, which has changed into dirty or more or less yellowish white through the glutinous layer; yellow or grey cloudy spots are of an accessory nature; when light penetrates through the shell it shows through light yellow tinged more or less greenish.
Average dimensions:	72.58 × 51.86 millimetres.
Average weight of shell:	10.76 grams.
Texture of shell:	to the unaided eye the texture is characterized by a uniform shagreen-like nature.
Shape:	ovoidal.
Nest:	composed of vegetable materials and lumps of earth; the lining also contains manure, rags, feathers, etc.
Site of nest:	on roofs of tall buildings, chimneys, etc.
Number of eggs:	3—5.
Breeding season:	April, May, June.
Duration of incubation:	about 30 days.
Remarks:	The description of these eggs by older writers [1]) as being coloured „ochre-yellow" or „yellowish green" is, in its generalness, certainly not correct. That, however, these shades occur occasionally, I do not at all consider excluded, as the intensity of the yellowish colour of the gluten varies in a considerable measure in different eggs, while the internal, more or less *greenish* yellow tint (those of *C. nigra* are coloured *intensely green* internally) makes it likely, in my opinion, that externally, too, a greenish tint sometimes occurs.

[1]) See NAUMANN, l. c. VI, p. 316.

a b

Ciconia ciconia (L.)

XXXV. Family PLATALEIDAE.

Family PLATALEIDAE.

Platalea leucorodia L. — Spoonbill.

(Plates 123—125, fig. a-f).

(Snouckaert: Avifauna Neerlandica, p. 85, No. 201).

Colour of surface of shell:	dull white, tinged more or less yellowish through the glutinous layer; when quite fresh sometimes with a faint bluish or greenish shade; when light penetrate through the shell it shows through a light greenish yellow.
Colour of spots:	dark, dirty olive-green, or dark, dirty brown, occasionally tinged with dirty rust-colour; sometimes underlying spots show through violet.
Average dimensions:	68 × 45.5 millimetres.
Average weight of shell:	6.9 grams.
Texture of shell:	corresponds, in comparison with that of *Ardea*, more with *A. purpurea* than with *A. cinerea;* grooves and rows of pores as in *Ardeidae*, often occur; among the pores there are some which are elongated *oblongly* on one side and look like notches made with the point of a knife. [1])
Shape:	usually elongated ovoidal.
Nest:	consists of rootstocks, reed stems of previous years, and blades of ordinary reed.
Site of nest:	on the ground in the midst of a dense reed vegetation (formerly, in this country, also in high trees and on low stumps of willows and alders); breeds in colonies.
Number of eggs:	3—4 (mostly 4, in exceptional cases more).
Breeding season:	April, May, June; eggs are sometimes also found even in July.
Duration of incubation:	about 28 days.
Remark:	NOZEMAN [2]) says that he has never seen any but *wholly white* eggs, which statement, in view of the number that he must have seen, I can only explain by assuming that he always took pigment spots to be accessory spots caused by nest-dirt or in other manner.

[1]) To this circumstance, particularly in respect of eggs of *Pl. leucorodia*, attention was drawn for the first time, and rightly I think, by von PETÉNYI. (See his „Ornithologische Fragmente", published at Gera-Untermhaus, 1905, p. 336) REY refers (l. c. page 439) to similar pores as occurring rather often in eggs of the *Ardeidae*. To me, however, they appear to be much less pronounced in eggs of the *Ardeidae* than in *leucorodia*-eggs.

[2]) Ned Vogelen, II, p. 171.

a b

Platalea leucorodia L.

c

d

Platalea leucorodia L.

e

f

Platalea leucorodia L.

XXXVI. Family RALLIDAE.

Family RALLIDAE.

Crex crex (L.) — Corn-Crake.

(Plates 126—127, fig. a-g).

(Snouckaert: Avifauna Neerlandica, p. 87, No. 203).

Colour of surface of shell:	brownish yellow, sometimes tinted greenish.
Colour of spots:	red brown; underlying spots show through violet grey. The larger spots generally run in a longitudinal direction.
Average dimensions:	36.5 × 26 millimetres.
Average weight of shell:	0.92 gram
Texture of shell:	slightly less finely granulated than in *Rallus aquaticus*.
Shape:	ovoidal.
Nest:	consists of vegetable materials.
Site of nest:	in a little hollow among long grass in grass-land; also sometimes in corn-fields.
Number of eggs:	7—9 (sometimes more; after-set: 5—7).
Breeding season:	end of June, July, August.
Duration of incubation:	about 21 days.
Remark:	See, for comparison with the eggs of *Rallus aquaticus*, the remark respecting that species

Family RALLIDAE.

Porzana porzana (L.) — Spotted Crake.

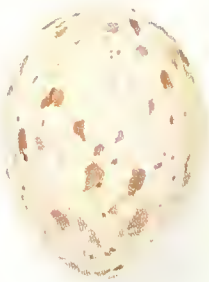
(Plate 128, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 87, No. 204).

Colour of surface of shell:	rusty yellow; olive—brown.
Colour of spots:	chestnut-brown; underlying spots show through ash-grey.
Average dimensions:	33.1 × 24 millimetres.
Average weight of shell:	0.79 gram.
Texture of shell:	corresponds in granulation with that of *G. chloropus*.
Shape:	oblong ovoidal or bellied-oval.
Nest:	consists of rushes, blades of reeds and grass-stalks.
Site of nest:	among reeds or in dense tufts of sedge.
Number of eggs:	8—12.
Breeding season:	May—June.
Duration of incubation:	about 21 days.

Fam. RALLIDAE.

a



b

c

d

Crex crex (L.)

Fam. RALLIDAE.

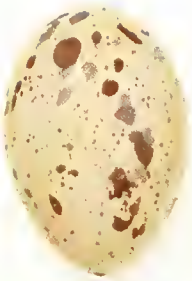
e

f

g

Crex crex (L.)

Fam. RALLIDAE.



a

b

c

Porzana porzana (L.)

Family RALLIDAE.

Porzana pusillus (Pallas) — Baillon's Crake.

(Plate 129, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 88. No. 206).

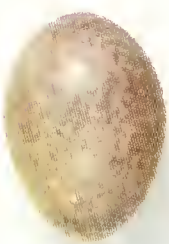
Colour of surface of shell:	greenish olive-yellow; oilily glossy.
Colour of spots:	the marking is of a marbled character in an olive-greyish-brown tint.
Average dimensions:	29.4 × 21.5 millimetres.
Average weight of shell:	0.52 gram.
Texture of shell:	finely granulated.
Shape:	short-ovoidal.
Nest:	consists of thin grass-stalks.
Site of nest:	among rushes and reed-grasses, on broken stalks, slightly above the water.
Number of eggs:	7—8.
Breeding season:	end of May, June, July.
Duration of incubation:	about 21 days.
Remark:	Dr. REY [1]) refers to the eggs depicted in BAEDEKER [2]) under the name of this species with the addition of: „(wohl *G. porzana ?*)"; the *pusillus*-egg seems, however, really to vary occasionally in the direction of that of *porzana*, as appears from „Ootheca Wolleyana" [3]).

[1]) l. c. page 459.
[2]) l. c., Tab. 44, Fig. 3.
[3]) Part III, p. 45, § 3102.

Fam. RALLIDAE.

a

b



c

Porzana pusillus (Pallas).

Family RALLIDAE.

Rallus aquaticus L. — Water-Rail.

(Plate 130, fig. a-c).

(Snoeckaert: Avifauna Neerlandica, p. 88, No. 207).

Colour of surface of shell:	light cream-colour; yellowish white; sometimes greenish white.
Colour of spots:	red brown; underlying spots show through ashgrey.
Average dimensions:	35 × 26 millimetres.
Average weight of shell:	0.9 gram.
Texture of shell:	particularly finely granulated.
Shape:	ovoidal or more bellied.
Nest:	consists of dry blades of reeds, rushes and blades of grass.
Site of nest:	in marshes and other permanently moist spots, overgrown with grass and willow-or alder-bushes, under the shelter of a tall plant or shrub, often near the side of a ditch.
Number of eggs:	6—10 (sometimes more).
Breeding season:	April—June.
Duration of incubation:	about 21 days.
Remark:	As compared with eggs of *crex* those of *aquaticus* are distinguishable by: — 1. smaller size; 2. finer shell; 3. paler ground-colour; 4. sparser marking; and 5. mostly rounder shape of the spots. In NOZEMAN [1]) the egg-type of this species is also wrongly depicted.

[1]) Ned. Vogelen, III (added on the plate of *Anas marila*).

Fam. RALLIDAE.

a

b

c

Rallus aquaticus L.

XXXVII. Family FULICIDAE.

Family FULICIDAE.

Gallinula chloropus (L.) — Moor-Hen.

(Plates 131—132, fig. a—f).

(Snouckaert: Avifauna Neerlandica, p. 89, No. 208).

Colour of surface of shell:	greyish or brownish yellow.
Colour of spots:	brownish red; underlying spots show through violet.
Average dimensions:	40.7 × 29 millimetres.
Average weight of shell:	1.8 grams.
Texture of shell:	rather finely granulated.
Shape:	mostly ovoidal.
Nest:	consists of reeds or reed-grasses; the tree-nests of twigs and stalks, covered with dry leaves.
Site of nest:	in, or in the immediate vicinity of water, among reed-grasses, on stumps of willows, alders or ash-trees, sometimes at a fairly considerable height; also in hawthorns, hedges, etc.
Number of eggs:	8—10.
Breeding season:	mid-May, June, July.
Duration of incubation:	about 21 days.
Remark:	For meritorious NOZEMAN, who describes *chloropus*-eggs shortly as „white", the saying „quandoque bonus dormitat Homerus" may obtain.

Family FULICIDAE.

Fulica atra L. — Coot.

(Plate 133, fig. a—d).

(Snouckaert: Avifauna Neerlandica, p. 89, N°. 209).

Colour of surface of shell:	light greyish or yellowish.
Colour of spots:	the specks and small spots dark brown to black; occasionally occurring larger spots are red brown; underlying spots show through grey.
Average dimensions:	53,5 × 36 millimetres. (The size varies considerably).
Average weight of shell:	3.2 grams.
Texture of shell:	uniformly granulated, but the grain is slightly less fine than in *Gallinula chloropus*.
Shape:	mostly oblong ovoidal.
Nest:	composed of dead stalks of water plants, mostly on a bedding of reed stubble.
Site of nest:	near open water among reeds, between other Gramineae or Typhaceae (in the Naardermeer mostly between Sparganium-blades, about ½ Metre above the water); sometimes on floating masses of plants.
Number of eggs:	7—12.
Breeding season:	April, May, June.
Duration of incubation:	about 21 days.
Remarks:	HOCKE mentions [1]) an *atra*-clutch (Brandenburg, 15—V—1910), of which all the eggs are marked on a dull lime-white ground-colour, with many dark yellow, yellowish brown, reddish, and purplish spots of various shapes and sizes, instead of being marked with black spots. In my collection there is an aberrant *atra*-egg [2]), which is wholly devoid of the typical black specks, and which combines a texture of shell as well as a ground-colour of its own species with a marking corresponding in colour and shape with that of *Gallinula chloropus*. In June 1907 an *atra*-clutch was found in England composed of three eggs with a lighter ground-colour than usual and marked exclusively on the big end, the marks consisting of *large* spots. The above aberrations [3]) I mention especially in connection with the fact that, for the rest, the *atra*-egg should be regarded as belonging as regards colour and markings to those eggs that are very *constant*.

[1]) Zeitschr. f. Ool. (Hocke) XX. Jahrg., page 74.
[2]) Shown in „Verslagen en Mededeelingen der Nederlandsche Ornithologische Vereeniging", No. 5 (facing page 62, lowest figure).
[3]) Mentioned in: The Zoologist, 1907, p. 385.

Fam. FULICIDAE.

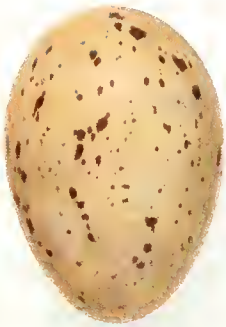
a

b

c

Gallinula chloropus (L.)

Fam. FULICIDAE.



d

e

f

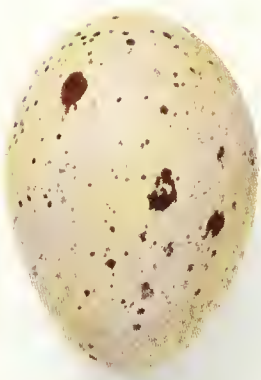
Gallinula chloropus (L.)

Fam. FULICIDAE.

a

b

c



d

Fulica atra L.

XXXVIII. Family OEDICNEMIDAE.

Family OEDICNEMIDAE.

Oedicnemus oedicnemus (L.) — Stone-Curlew.

(Plate 134, fig. a—d).

(Snouckaert: Avifauna Neerlandica, p. 91, No. 214).

Colour of surface of shell:	sandy; olive yellow or reddish yellow; sometimes tinged slightly greenish; in HEWITSON'S Work [1]) and in KRAUSE'S [2]) eggs are depicted with an *olive green* ground colour such as occurs in eggs of *Limosa limosa* and *Numenius arquata*.
Colour of spots:	brown, in various shades; underlying spots show through ash-grey.
Average dimensions:	54.5 × 38.7 millimetres.
Average weight of shell:	3.26 grams.
Texture of shell:	uniform and finely granulated.
Shape:	mostly ovoidal.
Incubating place:	on the ground, among much gravel or shells.
Number of eggs:	2. [3])
Breeding season:	end of May, June, beginning of July.
Duration of incubation:	about 4 weeks.

[1]) Eggs of British Birds, ed. 3, plate LXXIV, fig. 3. (Compare: Ootheca Wolleyana, Part III, p. 126, § 3540).

[2]) Oologia universalis palaearctica, middle clutch on the Plate.

[3]) In „Zeitschr. f. Ool." (Hocke) XX, p. 71, mention is made of a clutch consisting of *three* eggs, found in West-Prussia, 15—V—'10.

Fam. OEDICNEMIDAE.

a

b

c

d

Oedicnemus oedicnemus (L.)

XXXIX. Family CHARADRIIDAE.

XL. „ SCOLOPACIDAE.

Families CHARADRIIDAE and SCOLOPACIDAE.

(Plates 135—159).

A comparative consideration of the nature of the markings of the eggs of *Charadriidae* and *Scolopacidae*, breeding in this country, has led me to make the following remarks.

The fact that, in the literature on the subject, the egg of *Vanellus vanellus* has always served as a comparative object in describing the eggs of the other *Charadriidae* or of *Scolopacidae* — a practice that owes its origin solely to the „popularity" of the *vanellus*-egg — has not failed to give rise occasionally to inaccurate notions and descriptions.

Haematopus ostralegus, Aegialites hiaticula and *Aeg. alexandrinus* are distinguished from the average *vanellus*-type (medium sized, rather thickly set, shaded and confluent spots) by sharply outlined, non-confluent, often fairly sparsely set spots, with which, of the *Scolopacidae, Recurvirostra avosetta* associates closely oologically.

Aeg. dubius, compared with *hiaticula* and *alexandrinus,* is usually characterized by minute spots which frequently are not more than stipples, and on this account its eggs deviate still further from the said *vanellus*-type than do those of the last mentioned two species.

In the eggs of *Charadrius apricarius* the markings are often

confined to the big half of the egg; they are at any rate strongest there. This character of marking sometimes occurs in *vanellus*-eggs, but it cannot obtain as the average type of marking of that species.

Among the *Scolopacidae, Scolopax rusticola* is well specialized oologically by shape and ground colour; the ground colour reminds one of one of the egg-types of *Perdix perdix;* the marking is allied to that of *Limosa limosa* and *Numenius arquata.* On examining the shell I observed that it deviates, internally also, from that of all other species belonging to both the *Scolopacidae* and the *Charadriidae*, as the fundamental layers are *not* coloured bluish green, but are *white*; the four abnormal unspotted eggs in the set depicted in DRESSER'S Work [1]), *in which the surface pigment-layer is also absent*, are in fact all *pure white.*

The eggs of *Totanus totanus* which mostly show dark, sharply outlined spots that are usually evenly distributed over the whole surface, possess in this respect characteristics which are peculiar in a much greater measure to *Charadriidae* than to *Scolopacidae.*

A marking running *spirally* is an almost unvarying rule in eggs of *Scolopax rusticola, Gallinago gallinago,* and *Pelidna alpina schinzii;* in *Totanus glareola* it occurs rather strongly; on the other hand, it is rarely pronounced in *T. totanus, Pavoncella pugnax, Limosa limosa* and *Numenius arquata.*

A striking peculiarity of the above mentioned marking, occurring, e. g., sometimes in eggs of *Sternidae* also, is the fact that the spiral is *dextral* in every instance: there are no exceptions [2]).

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[1]) l. c. page 686.

[2]) See: Dr. ALTUM, Die spiralige Anlage in der Zeichnung vieler Vogeleier. (Journ. f. Ornith., XII, 1864, p. 103 et seq.) and: G. KRAUSE, Die Oologie und ihre Eigenheiten, IV. „Dreher". (Zeitschr. f. Ool. [KRAUSE] I, 1911, Nr. 7, p 52 et seq.).

Among the eggs of *L. limosa* and *N. arquata* there are likewise some that converge more or less in colour as well as in the nature of their markings. In my opinion, at any rate, a closer oological relationship exists between these species mutually than between either of the two and other *Scolopacidae*, although points of agreement with *pugnax*-eggs are not lacking.

A marking consisting partly of short lines, curls and scrawls, occurs not infrequently among eggs of *H. ostralegus*, *V. vanellus*, *P. pugnax* and in those of the genus *Aegialites*. In those of *H. ostralegus*, but particularly in those of *Aeg. alexandrinus*, the real vein- (= „emberiza-") marking often occurs.

The „veil" (= a thin layer of carbonate of lime [+ keratin, an albuminoid] finally deposited over the whole surface of the egg, which is otherwise normally coloured and marked, and which thereby acquires a bluish grey aspect) is found, amongst others, sometimes in the eggs of *L. limosa* and frequently in those of *T. totanus*.

ALTUM [1]) assumed that in the eggs of *Charadriidae*, *Scolopacidae* and others the ground colour and the spots are from one and the same pigment. According to KRUKENBERG [2]), on the other hand, in those eggs of the said Families which have a yellowish or brownish ground colour, the latter may almost certainly be attributed to *oochlorine*, the colour of the spots however to *oorhodeine*.

Finally, I wish here to point to the affinity of the *Charadriidae* and *Scolopacidae* to the *Laridae* and *Sternidae* which is so conspi-

[1]) Journ. f. Ornith. 1863, p. 339 et seq. and do. 1864, p. 23 et seq.

[2]) Die Farbstoffe der Vogeleierschalen, in: Verh. d. phys.-med. Gesellsch. N. F. XVII. Bd. p. 119.

cuous, oologically too, and in this connection to draw attention more particularly to the genera *Larus, Sterna* and *Hydrochelidon* of these Families.

VANELLUS VANELLUS (L.).

As regards the so-called „mimicry" of *vanellus*-eggs, namely the resemblance of their ground colour to that of the soil on which they are laid, it should be observed that quite as many cases occur in which this resemblance does *not* exist as in which it *does* exist more or less; at any rate a general and constant phenomenon in the above sense cannot be said to exist.

That the difference in colour and spots is connected either with the age of the female birds (the eggs of old female birds are said to be of a darker tint and to show larger, frequently confluent, spots than those of young female birds) or with the food offering in their vicinity, and with the time when the eggs are laid, has still to be effectively confirmed by scientific investigation and experiments. [1])

Even if the influence of the food is assumed a priori as certain, the question, amongst others, as to whether a *particular kind of food causes a particular colour and marking* or whether only a *more or less plentiful nourishment* has a governing effect, still remains unanswered.

If the *vanellus*-clutches found towards the end of A pril are darker on the whole than those found in the latter part of March (cf. what is said respecting *Charadrius apricarius*), the *quantity* as well as

[1]) The discolouration of the eggshell obtained artificially (namely by means of unnatural food) in the case of *Fringillidae* kept in confinement, can, in my opinion, scarcely obtain as an in every respect decisive result where the question here involved is the influence of natural food on the pigmentation of the eggshell in the case of wild birds.

the *nature* of the food may, in my opinion, be the cause. (See in this connection what is said respecting *Larus argentatus* in the introduction to the XLI. Family).

CHARADRIUS APRICARIUS L.

Dr. SAXBY says [1]) that after observing a large number of clutches during many years, he was struck by the regularity with which a certain colour of the eggshell predominated according as the season was advanced. As a general rule, the early sets seemed to him to be of a dull tint with an olive green ground colour; slightly later on a creamy white, often tinged with warm yellowish brown, occurred; the latter shade was deepest and was found most frequently in June and July when the breeding season was approaching its termination; the spots were then also very numerous and coloured more or less reddish brown.

SAXBY's opinion that the dull tinted eggs which are laid early in the season, are probably laid by *older* female birds, is not supported by motives.

AEGIALITES HIATICULA (L.).

As in all the kinds of eggs of which the fundamental layers are coloured a more or less distinct greenish blue by a compound of oocyanin and lime, in *hiaticula,* too, eggs and occasionally a whole set, are found in which owing to the absence of the usual surface pigment-layer (sometimes also of the spots) this greenish blue colour occurs on the outside as surface pigment. In such eggs the composition of the lime shell is in some instances normal and in others abnormal.

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[1]) See: F. POYNTING, Eggs of British Birds, *Limicolae.* (London, 1895—6) p. 40.

It is not clear to me on what grounds such eggs (even if a whole clutch is concerned) are spoken of in certain ornithological or general zoological periodicals [1]) as „very remarkable" and „particularly interesting"; this would be the case if the phenomenon began to occur repeatedly (provided with a *normal* composition of the lime shell) in a species such as *hiaticula*, if it belonged to a genus or family in which a bluish green ground colour was the normal one of the eggs of one or more species belonging to it.

SEEBOHM says [2]) that so far as he has been able to ascertain, the birds of this species breeding in the British Isles and in Western Europe, lay *larger* eggs than those propagating elsewhere.

AEGIALITES ALEXANDRINUS (L.).

F. CERVA mentions [3]) a clutch consisting of two eggs one of which was normally coloured, but the other had a dull *reddish white* ground colour strewn with very small reddish brown spots and specks, and which when light penetrated through it showed through *white. As the absence of oocyanin in the very species in which it occurs as a rule, is highly rare,* I mention CERVA's statement here.

RECURVIROSTRA AVOSETTA L.

Fig. 3 on the plate in POYNTING's Work [4]) shows *rust-coloured* spots amongst the normal spots. The former, it appears to me, may indeed be of an accessory nature.

[1]) The Zoologist (1907, p. 23).
British Birds (Vol. II, p. 134/5).
[2]) History of British Birds, Vol. III, p. 20.
[3]) Nidologische und oologische Beobachtungen, in „Aquila", XIV (1907).
[4]) Eggs of British Birds, *Limicolae.* Part. I.

LIMOSA LIMOSA (L.).

In fig. 6 on the plate in POYNTING's Work [1]) the ground colour is a *yellowish white* strewn with small *rust-coloured* spots and specks; on the big half of the egg a few large underlying spots show through purple grey.

The eggs of this species cannot be distinguished with certainty from those of *Limosa lapponica (L.) — Bar-Tailed Godwit* [2]). All that canbe said is that the eggs of the latter are usually *smaller* than those of *L. limosa*.

[1]) Eggs of British Birds, *Limicolae*. Part. II.
[2]) See: SNOUCKAERT, Avifauna Neerlandica, p. 106, no. 251.

Family CHARADRIIDAE.

Haematopus ostralegus (L.) — Oyster-Catcher.

(Plate 135, fig. a-d).

(Snouckaert: Avifauna Neerlandica, p. 92, No. 217).

Colour of surface of shell:	olive or rusty yellow, in various — mostly light — shades; sometimes slightly greenish.
Colour of spots:	rusty brown; blackish brown; underlying spots show through ash-grey.
Average dimensions:	55.3 × 39.6 millimetres.
Average weight of shell:	3.25 grams.
Texture of shell:	rather coarsely granulated.
Shape:	ovoidal.
Nest and its site:	on the ground in a slight hollow which sometimes contains a few stalks, reeds, small stones and shells; among stones without any intervening layer.
Number of eggs:	3—4 (in Texel, e. g., 4 as a rule; a few late sets 3).
Breeding season:	beginning of May, June.
Duration of incubation:	fully 3 weeks.
Remark:	eggs with an abnormal lime shell and marking are known in Texel by the name of „botkoleieren".

Family CHARADRIIDAE.

Vanellus vanellus (L.) — Lapwing.

(Plates 136—137, fig. a-h) *).

(Snouckaert: Avifauna Neerlandica, p. 93, No. 219).

Colour of surface of shell:	dull olive greenish, greyish, yellowish, or brownish.
Colour of spots:	black; blackish brown; *only shading into rusty red or dark blood red in exceptional cases;* underlying spots show through ash-colour.
Average dimensions:	45.4 × 32.7 millimetres.
Average weight of shell:	1.56 gram.
Texture of shell:	fine, evenly granulated.
Shape:	mostly more or less pyriform, either broad and short, or elongated.
Nest and its site:	on the ground in a slight hollow with some vegetable material as bedding; sometimes however without any lining.
Number of eggs:	4 eggs (as an exception: 5). [1]
Breeding season:	April, May, June.
Duration of incubation:	about 25 days; shorter periods of incubation, of 17 or 18 days, are also frequently stated. [2]

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[1]) See, as regards successive changes in the position of the eggs during incubation, the illustrated article bij Mr. A. JOMAN in „De Levende Natuur", 12th annual series, p. 196 et seq.

[2]) See: „De Levende Natuur", 16th annual series, pp. 93—94.

*) *Abnormal* eggs of a *pathological* nature are not depicted in this work, as they do not fall within its scope.

Family CHARADRIIDAE.

Charadrius apricarius L. — Golden Plover.

(Plate 138, fig. a—c).

(Snouckaert: Avifauna Neerlandica, p. 94, No. 221).

Colour of surface of shell:	pale olive yellow; soft reddish brown; cream-coloured; pale greenish grey.
Colour of spots:	black, *shading into dark blood red;* reddish brown; underlying spots show through violet grey.
Average dimensions:	51.5 34.5 millimetres.
Average weight of shell:	1.65 gram.
Texture of shell:	smooth and very evenly granulated; the grain is particularly fine (much finer than in the case of *V. vanellus*).
Shape:	oblong, more or less pyriform.
Nest and its site:	on the ground, in a little hollow which sometimes contains some dry vegetable material as lining.
Number of eggs:	4.
Breeding season:	end of April, May, June.
Duration of incubation:	about 27 days.

Fam. CHARADRIIDAE.

a

b

c

d

Haematopus ostralegus L.

Fam. CHARADRIIDAE.

a

b

c

d

Vanellus vanellus (L.)

Fam. CHARADRIIDAE.

e

f

g

h

Vanellus vanellus (L.)

Fam. CHARADRIIDAE.

a

b

c

Charadrius apricarius L.

Family CHARADRIIDAE.

Aegialites dubius (Scopoli) — Little Ringed Plover.

(Plate 140, fig. a—d).

(Snouckaert: Avifauna Neerlandica, p. 95, No. 225).

Colour of surface of shell:	sandy, in pale as well as in more pronounced yellowish shades; sometimes with a slightly rusty tinge.
Colour of spots:	brownish black; underlying spots show through ash-grey.
Average dimensions:	30.2 · 22 millimetres.
Average weight of shell:	0.44 gram.
Texture of shell:	stands as regards fineness of granulation between those of *hiaticula* and *alexandrinus*.
Shape:	bellied, or more or less elongated pyriform.
Nest and its site:	in a little hollow in the ground, among gravel, without any lining.
Number of eggs:	3—4 (usually 4).
Breeding season:	May, June.
Duration of incubation:	about 3 weeks.

Family CHARADRIIDAE.

Aegialites alexandrinus (L.) — Kentish Plover.

(Plate 141, fig. a-f).

(Snouckaert: Avifauna Neerlandica, p. 96, No. 226).

Colour of surface of shell:	varies from dull sand-colour to olive brownish.
Colour of spots:	black; underlying spots show through ash-grey.
Average dimensions:	33 × 23.5 millimetres.
Average weight of shell:	0.6 gram.
Texture of shell:	fine-grained, evenly granulated; the shell is slightly *rougher* to the touch than that of *hiaticula* and *dubius*.
Shape:	usually more ovoidal than pyriform.
Nest and its site:	on the ground in a little hollow surrounded by small shells.
Number of eggs:	3.
Breeding season:	May, June.
Duration of incubation:	about 3 weeks.

Family SCOLOPACIDAE.

Recurvirostra avosetta L. — Avocet.

(Plates 142—143, fig. a-f).

(Snouckaert: Avifauna Neerlandica, p. 97, No. 228).

Colour of surface of shell:	ranges from olive yellowish to brownish sometimes light greyish.
Colour of spots:	black; underlying spots show through grey.
Average dimensions:	49.8 × 35 millimetres.
Average weight of shell:	2.2 grams.
Texture of shell:	fine, but slightly less smooth than in the next five species.
Shape:	ovoidal or more pyriform.
Nest and its site:	on the ground, in a little hollow lined with dry vegetable material.
Number of eggs:	3—4 (as a rule 4).
Breeding season:	May, June.
Duration of incubation:	fully 3 weeks.

a

b

c

d

e

f

Aegialites hiaticula (L.)

Fam. CHARADRIIDAE.

a

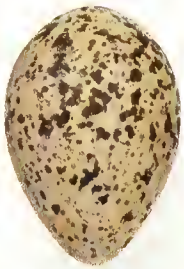
b

c

d

Aegialites dubius (Scopoli).

a



b

c

d

e

f

Aegialites alexandrinus (L.)

Fam. SCOLOPACIDAE.

a

b

c

Recurvirostra avosetta L.

Fam. SCOLOPACIDAE.

d

e

f

Recurvirostra avosetta L.

Family SCOLOPACIDAE.

Scolopax rusticola L. — Woodcock.

(Plate 144, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 98, No. 231).

Colour of surface of shell:	ranges from cream-colour and greyish white to light yellowish brown; when light penetrates through the shell it shows through *reddish yellow*, in which respect it deviates from the eggshells of the other *Scolopacidae*, all of which, like those of the *Charadriidae*, show through pale greenish when light penetrates through them.
Colour of spots:	dark reddish or yellowish brown; underlying spots show through grey or purplish.
Average dimensions:	44.2 × 33.4 millimetres.
Average weight of shell:	1.4 gram.
Texture of shell:	very fine and smooth.
Shape:	mostly more oval than pyriform.
Nest and its site:	on the ground, in a little hollow lined with dry vegetable material.
Number of eggs:	4.
Breeding season:	March [1]), April May.
Duration of incubation:	about 3 weeks.

[1]) Dr. R. Baron SNOUCKAERT VAN SCHAUBURG was so kind as to inform me that he had this year (1912) received a report that in North Brabant on April 8th a nest was found containing 3 eggs, of which two were already chipping, on the point consequently of being hatched.

In Gelderland, in 1907, the species was found brooding in the middle of March. (See: Versl. en Med. d. Ned. Orn. Ver. No. 5 p. 25).

Family SCOLOPACIDAE.

Gallinago gallinago (L.) — Common Snipe.

(Plates 145—147, fig. a-l).

(Snouckaert: Avifauna Neerlandica, p. 99, No. 233).

Colour of surface of shell:	ranges from pale greyish to light olive green. and from pale honey-colour to deep olive brown.
Colour of spots:	brown, in various shades; at the blunt end black spots and thick convolutions often occur; underlying spots show through purplish grey; the marking has, with scarcely any exceptions, a dextral spiral course.
Average dimensions:	39.5 × 28 millimetres.
Average weight of shell:	0.8 gram.
Texture of shell:	fine and smooth.
Shape:	mostly pyriform, sometimes more oval.
Nest and its site:	on the ground. in a little hollow sometimes lined with a little dry vegetable material.
Number of eggs:	4.
Breeding season:	April, May, June.
Duration of incubation:	about 3 weeks.

Family SCOLOPACIDAE.

Pelidna alpina schinzii (Brehm) — Dunlin.

(Plate 148, fig. a-d).

(Snouckaert: Avifauna Neerlandica, p. 101, No. 237).

Colour of surface of shell:	Varies between pale green, in different shades, pale olive yellow and light yellowish brown; often with a more or less oily gloss.
Colour of spots:	brown in various shades; underlying spots show through light purplish; the spots mostly have a dextral spiral course.
Average dimensions:	34 × 24 millimetres.
Average weight of shell:	0.47 gram
Texture of shell:	fine and smooth.
Shape:	pyriform.
Nest and its site:	on the ground, in a little hollow, lined with stalks.
Number of eggs:	4.
Breeding season:	end of April, May, June.
Duration of incubation:	about 3 weeks.

Family SCOLOPACIDAE.

Pavoncella pugnax (L.) — Ruff.

(Plates 149—150, fig. a-f).

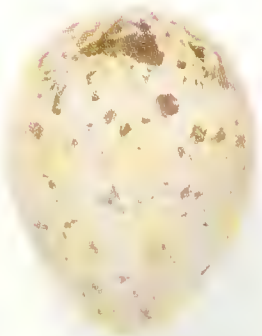
(Snouckaert: Avifauna Neerlandica, p. 103, No. 244).

Colour of surface of shell:	varies between pale grey, olive green, brownish yellow and light brown; often with a more or less oily gloss.
Colour of spots:	brown, in various shades; underlying spots show through olive grey.
Average dimensions:	43.4 × 30.8 millimetres.
Average weight of shell:	0.9 gram.
Texture of shell:	fine and smooth.
Shape:	pyriform.
Nest and its site:	a hollow in dense tufts of sedge, lined with a little vegetable material.
Number of eggs:	4.
Breeding season:	May, June.
Duration of incubation:	about 3 weeks.

Fam. SCOLOPACIDAE.

a

b



c

Scolopax rusticola L.

Fam. SCOLOPACIDAE.

a

b

c

d

Gallinago gallinago (L.)

Fam. SCOLOPACIDAE.

e

f

g

h

Gallinago gallinago (L.)

Fam. SCOLOPACIDAE.

i

j

k

l

Gallinago gallinago (L.)

Fam. SCOLOPACIDAE.

a

b

c

d

Pelidna alpina schinzii (Brehm).

Fam. SCOLOPACIDAE.

a

b

c

Pavoncella pugnax (L.)

Fam. SCOLOPACIDAE.

d

e

f

Pavoncella pugnax (L.)

Family SCOLOPACIDAE.

Totanus glareola (L.) — Wood-Sandpiper.

(Plate 151, fig. a—c).

(Snouckaert: Avifauna Neerlandica, p. 104, No. 245).

Colour of surface of shell:	mostly light green or greenish white; sometimes tinged more or less yellowish brown.
Colour of spots:	reddish brown; chocolate brown; underlying spots show through lilac or ash colour; the spots have a more or less dextral spiral course.
Average dimensions:	38 × 26 millimetres.
Average weight of shell:	0.63 grams.
Texture of shell:	fine and smooth.
Shape:	pyriform, sometimes sharply pointed.
Nest and its site:	in dense tufts of grass, in a hollow *), lined with some stalks and blades of grass.
Number of eggs:	4.
Breeding season:	end of April, May, June.
Duration of incubation:	about 3 weeks.
***Remark:**	in other countries it has been found brooding in old nests of *Turdinae*.

Family SCOLOPACIDAE.

Totanus totanus (L.) — Common Redshank.

(Plates 152—154, fig. a-l).

(Snoeckaert: Avifauna Neerlandica, p. 105, No. 249).

Colour of surface of shell:	ranges from greyish, greenish, brownish or cream-coloured yellow to deep ochreous yellow *)
Colour of spots:	chocolate brown and black; underlying spots show through light purplish, at the big end a few fine veins often occur.
Average dimensions:	44 × 30.5 millimetres.
Average weight of shell:	1.15 grams.
Texture of shell:	fine, but slightly less smooth than in the preceding five species.
Shape:	pyriform.
Nest and its site:	a little hollow in a dense tuft of grass, lined with blades of grass.
Number of eggs:	4.
Breeding season:	April, May, June.
Duration of incubation:	about 3 weeks.
*** Remark:**	the egg depicted in NOZEMAN (Nederl. Vogelen, III, p. 259) has an olive greyish green ground colour, which frequently occurs, e.g., in the eggs of *P. pugnax* and *N. arquata*, but which, as far as I am aware, has *never* been observed in *T. totanus*.

Family SCOLOPACIDAE.

Limosa limosa (L.) — Black-tailed Godwit.

(Plates 155—156, fig. a-f).

(Snouckaert: Avifauna Neerlandica, p. 107, No. 252).

Colour of surface of shell:	ranges from olive green to olive brown, in various shades.
Colour of spots:	brownish; underlying spots show through indistinctly greyish; black specks frequently occur, spread here and there over the whole shell, especially at the big end.
Average dimensions:	55 × 38 millimetres.
Average weight of shell:	2.3 grams.
Texture of shell:	fine and smooth, granulated very evenly.
Shape:	pyriform, either elongated, or shorter and broader.
Nest and its site:	on the ground, in a little hollow, lined with some vegetable material.
Number of eggs:	4 (in very rare instances 5).
Breeding season:	end of April, May.
Duration of incubation:	about 4 weeks.

Family SCOLOPACIDAE.

Numenius arquata (L.) — Common Curlew.

(Plates 157—159, fig. a—f).

(Snouckaert: Avifauna Neerlandica, p. 107, No. 252).

Colour of surface of shell:	olive green, olive yellow, olive grey, or olive brown, in various shades; often with a more or less oily gloss.
Colour of spots:	brown, in various shades; the colour of the underlying spots, as showing through, is pale purple.
Average dimensions:	67 × 46.7 millimetres.
Average weight of shell:	4.5 grams.
Texture of shell:	slightly more unevenly grained than that of *L. limosa*.
Shape:	mostly pyriform; sometimes pointed oval.
Nest and its site:	on the ground, in a little hollow which is sometimes lined with a little dry vegetable material.
Number of eggs:	4.
Breeding season:	end of April, May, June.
Duration of incubation:	about 4 weeks.

Fam. SCOLOPACIDAE.

a

b

c

Totanus glareola (L.)

Fam. SCOLOPACIDAE.

a

b

c

d

Totanus totanus (L.)

Fam. SCOLOPACIDAE.

e

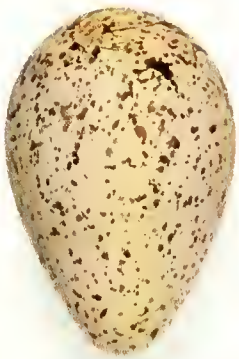
f

g

h

Totanus totanus (L.)

Fam. SCOLOPACIDAE.



i

j

k

l

Totanus totanus (L.)

Fam. SCOLOPACIDAE.

a

b

c

Limosa limosa (L.)

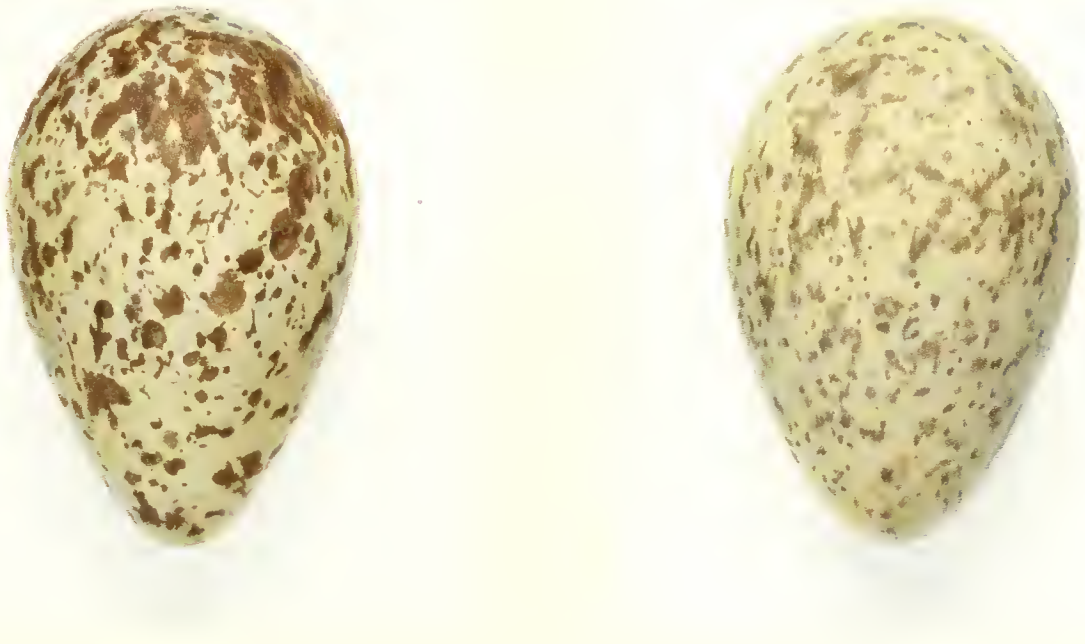
Fam. SCOLOPACIDAE.

d

e

f

Limosa limosa (L.)



a b

Numenius arquata (L.)

c

d

Numenius arquata (L.)

e

f

Numenius arquata (L.)

XLI. Family LARIDAE.

XLII. „ STERNIDAE.

Families LARIDAE and STERNIDAE.

(Plates 160—180).

LARUS ARGENTATUS BRÜNNICH.

DR. G. A. VENEMA [1]) wrote as follows about the difference in the colour of the shell of *argentatus*-eggs:

„ . . . It will, I am sure, not be considered strange if I declare that I regard „the difference in the colour of the shell of the eggs to be dependent on the „nature of the food. The Herring-Gull eats small fishes by preference, which „in mild weather, if it is not blowing too hard, it catches in the shallows, „or which it is able to find in the crests or hollows of the waves. The food „which it considers tastiest is young flounders, plaice, and sole which in „many instances are born in the shallows to be trained there for the turbulent „life at sea, and hence the Herring-Gull visits fishermen at sea when they are „drawing in their nets and it likes to follow shoals of rapacious fish, as they „cause the small fishes on which they prey to flee to the surface. When this „fish food is eaten the eggs which the Herring-Gull lays acquire a very „*light blue* colour.

„If in the breeding season the weather is cold and bleak the young flatfishes „do not venture into the upper layers of the brackish or salt water but hide „in the depths below. The Herring-Gull which cannot reach them there and

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[1]) See his article: „Over het eiland Rottum", occurring in: „Bijdragen tot de kennis van den tegenwoordigen staat der Provincie Groningen", Vol. IV (Groningen, 1869), p. 400 et seq.

„which is moreover not very skillful in catching fish, is compelled to choose „other food, and it then seeks by preference young mussels *(Mytelus edulis)* „edible cockles *(Cardium edule)*, tellinas *(Tellina solidula)*, and especially „five-fingers *(Asteria rubens)*, the latter being borne by the turbulent water to „the surface; and all these animals it devours, the first three even with the shells.

„On examining the excrement and vomit of these birds, which are usually „seen near the Herring-Gull nests, I saw from the broken remains of the shells „occurring therein which of the Mollusca the Herring-Gull must perforce take „as its food. If therefore the weather compels it to select shellfish for its „food, the colour of the shells of the eggs it lays becomes a dirty *greyish green*.

„If I am asked as to the cause of the eggshells being coloured greener when „the Herring-Gull has to choose the said Mollusca for its food, I must confess „that I am unable to indicate the cause".

I cannot conjecture why DR. VENEMA here opposes the greyish green shell-colour, exclusively, to the light blue shell-colour, and thus leaves the *olive yellowish* and *brownish* shell-colours wholly out of consideration, notwithstanding the fact that, together, the latter two occur in at least as large, if not larger, numbers than the greyish green eggs. For the rest, the above quotation naturally contains nothing more than an *hypothesis* about the effect of food on the coloration of the eggshell, regarding which I wish to make the following observations.

Whenever the *light blue* colour occurs, it always does so *as an exception* only; e.g., OTTO LEEGE [1]) saw in the middle of the breeding season of 1909 among about *1100* clutches, and in that of 1910 among about *1200* clutches, only *a few light blue eggs*, and on July 15 *none* of that colour, from which would have to follow that *a few argentatus*-individuals occasionally eat a small fish as a rare exception.

Furthermore, — if Dr. VENEMA'S supposition were correct — it would show that *Sterna fluviatilis* e. g. differs strongly from *L. argentatus* physiologically in respect of the influence of food on the

[1]) Ornith. Monatsschr. 1911, No. 1, pag. 44.

coloration of the eggshell, as otherwise in *S. fluviatilis* the *light blue* colour of the shell, even if not without exceptions, would most decidedly have to be the *rule*, which is far from being the case.

To me it would seem more probable that the *age* of the female birds forms the dominating factor in the pigmentation of the eggshell, to which circumstance MORRIS, amongst others, drew attention in respect of *Buteo buteo* (see the observations regarding this species in my general review of the XVII. Family: *Falconidae).*

Nevertheless, to Dr. *Venema* is due the merit of having drawn attention to this point; and the subject is worth investigating. Certainty will however only be obtainable by means of experiments with birds propagating in confinement.

As is the case with the other *Laridae*, the eggs of one clutch often differ mutually to a considerable extent in *argentatus* also. Thus Dr. E. D. VAN OORT states [1]) that in June 1909 he found in the dunes near Wassenaar a set consisting of two normally coloured eggs and one egg with a heron-blue ground colour, finely speckled with pale grey, and marked, particularly at the big end, with a few large dark olive brown and black spots, as also with a few faint greyish violet clouds. The three eggs are all of normal size.

STERNA CANTIACA GMELIN.

At the conclusion of my monograph [2]) about the *cantiaca*-eggs I recapitulate that among the so diversified markings three types are found in the main, viz:

[1]) Report on birds from the Netherlands received from 1 September 1908 till 1 September 1909, in: Notes from the Leyden Museum, Vol. XXXI (Note XIV, p. 218).

[2]) About the markings, and the nature of their variations, of the eggs of *Sterna cantiaca Gmelin*, in „Verslagen en Mededeelingen der Nederlandsche Ornithologische Vereeniging", No. 1, p. 49—52.

1. with very large, and partly smaller, irregularly shaped and unequally distributed spots, or with hieroglyphic-like figures (such as in *Alca torda, Uria lomvia*, and others);
2. with an olive yellowish or brownish ground colour, marked with spots of middling size, more particularly at the big end (such as in *Charadrius apricarius, Recurvirostra avosetta,* and others); and
3. with a yellowish white ground colour, on which chiefly smaller, sharply accentuated, blackish brown spots are fairly evenly distributed (such as in *Larus gelastes*).

STERNA FLUVIATILIS NAUMANN AND S. MACRURA NAUMANN.

Opinions respecting oological points of difference between these two species are far from harmonizing; the views set forth in the literature on the subject, are frequently in direct contradiction to one another.

It would appear to me that all that can be said, up to the present at any rate, is that *macrura*-eggs are *as a rule* slightly smaller, especially narrower, and, as regards the weight of the shell, slightly lighter than those of *fluviatilis,* while a *greenish* ground colour seems to predominate in *macrura* and a *yellowish* or *yellowish brown* ground colour in *fluviatilis.*

HANTZSCH [1]) ascertained (in Iceland), in respect of several *macrura*-nests, different stages of incubation in the eggs of each nest, which strengthens his opinion that where there is a mutual difference, frequently strikingly great, in the colour and markings of the eggs from one and the same nest, these eggs have been laid by different female birds.

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[1]) Beitrag zur Kenntnis der Vogelwelt Islands (Berlin, 1905), p. 146.

Family LARIDAE.

Larus argentatus Brünnich — Herring-Gull.

(Plates 160—163, fig. a—h).

(Snouckaert: Avifauna Neerlandica, p. 111, No. 262).

Colour of surface of shell:	olive brown, olive yellow, olive green, or olive grey, in various shades.
Colour of spots:	olive yellow; from yellowish brown to blackish brown; underlying spots show through grey.
Average dimensions:	71 × 48 millimetres.
Average weight of shell:	6.2 grams.
Texture of shell:	coarse-grained (the composing particles of lime are very clearly distinguishable with the aided eye.
Shape:	rather slender on the whole, but varies considerably.
Nest and its site:	a hollow in dune sand, mostly under the shelter of sand-elymus plants and usually with a lining composed of vegetable material. (Breeds in colonies).
Number of eggs:	generally 3.
Breeding season:	May, June.
Duration of incubation:	about 4 weeks.

Family LARIDAE.

Larus canus L. — Common Gull.

(Plate 164, fig. a—d).

(Snouckaert: Avifauna Neerlandica, p. 111, N°. 265).

Colour of surface of shell:	olive brown, olive green, olive yellow, or olive grey, in various shades; almost always of an *oily gloss.*
Colour of spots:	blackish brown, mostly of a round shape; underlying spots show through grey; the markings are as a rule spread fairly evenly over the whole egg and rather frequently form a zone at the big end.
Average dimensions:	58 × 41 millimetres.
Average weight of shell:	3.3 grams.
Texture of shell:	as in *argentatus.*
Shape:	mostly ovoidal.
Nest:	mostly constructed rather strongly of vegetable material.
Site of nest:	on the ground. (Breeds in colonies).
Number of eggs:	2—3.
Breeding season:	May, June.
Duration of incubation:	about 4 weeks.

a

b

Larus argentatus Brünnich.

c

d

Larus argentatus Brünnich.

e

f

Larus argentatus Brünnich.

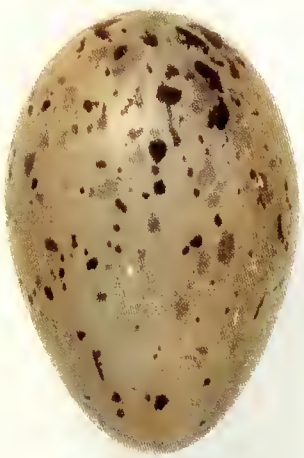
g h

Larus argentatus Brünnich.

Fam. LARIDAE.

a

b



c

d

Larus canus L.

Family LARIDAE.

Larus ridibundus L. — Black-headed Gull.

(Plates 165—169, fig. a-o).

(Snouckaert: Avifauna Neerlandica, p. 112, No. 266).

Colour of surface of shell:	olive brown, olive yellow, olive green, and olive grey, in various shades.
Colour of spots:	brown and blackish brown, in different tints; underlying spots show through pale purplish.
Average dimensions:	53.4 × 37 millimetres.*
Average weight of shell:	2.3 grams.
Texture of shell:	as a rule slightly finer than in *canus*.
Shape:	very variable; often pointed oval.
Nest:	consists of vegetable material, varying considerably in circumference.
Site of nest:	on the ground, in marshy places; among the grass in wet grassland; on floating reed-islands, etc. (Breeds in colonies).
Number of eggs:	generally 3.
Breeding season:	end of April, May, June.
Duration of incubation:	about 3 weeks.
***Remark:**	a *dwarf*-set (Schouwen, 1907) in my collection consists of *three* eggs measuring 36 × 27, 34 × 25, and 33 × 24⁵ millimetres; I mention this as *full dwarf-clutches* are very rarely found.

Family STERNIDAE.

Sterna cantiaca Gmelin — Sandwich Tern.

(Plates 170—173, fig. a—p).

(Snouckaert: Avifauna Neerlandica, p. 114, No. 272).

Colour of surface of shell:	ranges from white, through cream colour and light yellow, to brownish yellow, in various tints; aberrations occur in different shades of colour.
Colour of spots:	from dark brown to black; underlying spots show through purplish or grey. (For the nature of the markings see the introduction to the XLI. and XLII. Families).
Average dimensions:	51 × 36 millimetres.
Average weight of shell:	2.2 grams.
Texture of shell:	considerably finer and more even of grain than that of *L. ridibundus*.
Shape:	varies from pointed oval to pyriform.
Nest and its site:	on the ground (in long grass amongst material that has been washed ashore or in the sand) in a little hollow which is sometimes lined with a little dry vegetable material. (Breeds in colonies).
Number of eggs:	generally 2. *
Breeding season:	second half of May, June.
Duration of incubation:	about 3 weeks.
*** Remark:**	NORMAN GILROY states that in a little, very distant, breeding place (in one of the British Isles) — *where however there is an abundance of food* — 99 per cent of the clutches usually consist of *three* eggs. (British Birds, vol. III, p. 130).

Family STERNIDAE.

Sterna fluviatilis Naumann — Common Tern.

(Plates 174—176, fig. a-l).

(Snouckaert: Avifauna Neerlandica, p. 115, No. 274).

Colour of surface of shell:	ranges from pale green or bluish white, and greyish or greenish to umber yellow, in various shades. *
Colour of spots:	brown, in various tints; underlying spots show through purplish or grey.
Average dimensions:	41 × 30 millimetres.
Average weight of shell:	about 1 gram.
Texture of shell:	granulated very finely, evenly and smoothly.
Shape:	varies from broad blunt oval to pointed oval; sometimes pyriform.
Nest and its site:	on the ground, in a little hollow which is sometimes lined with dry vegetable material. (Breeds in colonies).
Number of eggs:	generally 3.
Breeding season:	May—June.
Duration of incubation:	about 18 days.
*** Remark:**	Mr. JAC. P. THYSSE [1]) found in most of the clutches *in separate nests* the mutual difference between the eggs of one clutch to be *much less* than in those *in colonies*.

[1]) See: JAC. P. THYSSE and R. TEPE, „Het intieme leven der Vogels" (Haarlem, 1906) p. 9.

Family STERNIDAE.

Sterna macrura Naumann [1] — Arctic Tern.

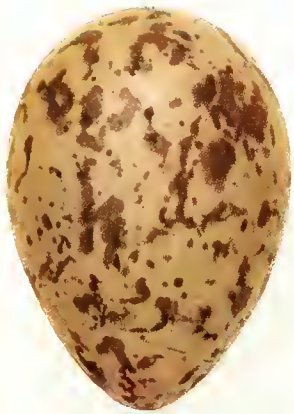
(Plates 177—178, fig. a-h).

(Snoeckaert: Avifauna Neerlandica, p. 116, No. 275).

Colour of surface of shell:	like that of the preceding species.
Colour of spots:	" " " " " "
Average dimensions:	40.5 × 29 millimetres.
Average weight of shell:	about 1 gram.
Texture of shell:	like that of the preceding species.
Shape:	" " " " " "
Nest and its site:	" " " " " "
Number of eggs:	usually 2.
Breeding season:	end of May, June.
Duration of incubation:	about 18 days.

[1]) See also the general review of the XLI. and XLII. Families, under: *S. fluviatilis* and *S. macrura*.

Fam. LARIDAE.



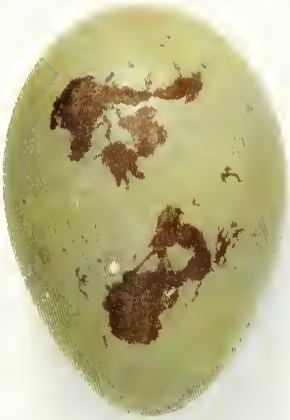
a

b

c

Larus ridibundus L.

Fam. LARIDAE.



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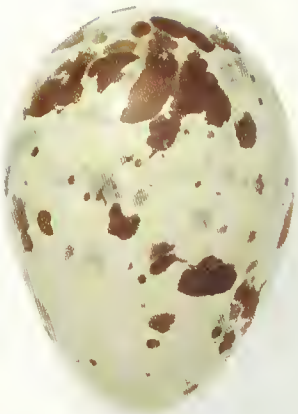


e

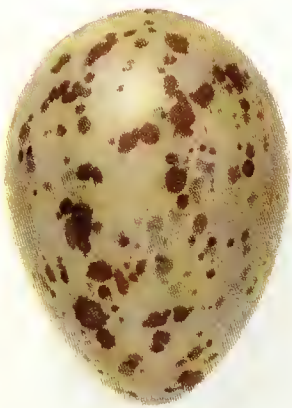
f

Larus ridibundus L.

Fam. LARIDAE.

g

h



i

Larus ridibundus L.

Fam. LARIDAE.

j

k

l

Larus ridibundus L.

Fam. LARIDAE.

m

n

o

Larus ridibundus L.

Fam. STERNIDAE.

a

b

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Sterna cantiaca Gmelin.

Fam. STERNIDAE.

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Sterna cantiaca Gmelin.

Fam. STERNIDAE.

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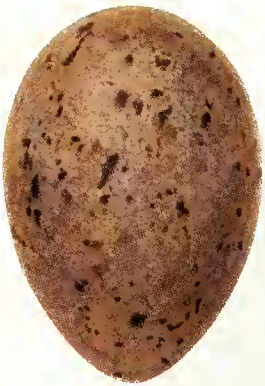
Sterna cantiaca Gmelin.

Fam. STERNIDAE.



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Sterna cantiaca Gmelin.

Fam. STERNIDAE.

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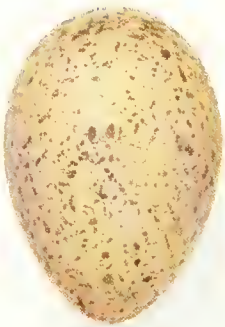
Sterna fluviatilis Naumann.

Fam. STERNIDAE.

e



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Sterna fluviatilis Naumann.

Fam. STERNIDAE.

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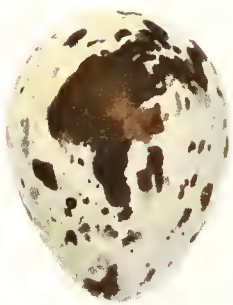


l

Sterna fluviatilis Naumann.

Fam. STERNIDAE.

a

b

c

d

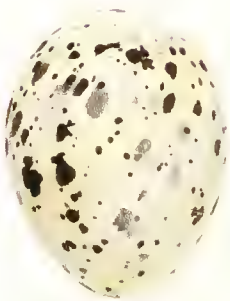
Sterna macrura Naumann.

Fam. STERNIDAE.

e

f

g



h

Sterna macrura Naumann.

a

b

c

d

e

f

Sterna minuta L.

Family STERNIDAE.

Sterna minuta L. — Little Tern.

(Plate 179, fig. a-f).

(Snouckaert: Avifauna Neerlandica, p. 116, No. 276).

Colour of surface of shell:	bluish-, greenish- or greyish white; it is frequently almost pure white; yellowish or brownish.
Colour of spots:	dark brown, in various shades; underlying spots show through the colour of ashes.
Average dimensions:	32 × 23 millimetres.
Average weight of shell:	0.58 gram.
Texture of shell:	like that of *fluviatilis*.
Shape:	mostly a regular or a pointed oval.
Nest and its site:	in a little hollow on the ground, in places were shells are plentiful. (Breeds in colonies).
Number of eggs:	usually 3.
Breeding season:	end of May to June.
Duration of incubation:	about 16 days.

Family STERNIDAE.

Hydrochelidon nigra (L.) — Black Tern.

(Plate 180, fig. a-f).

(Snouckaert: Avifauna Neerlandica, p. 116, No. 277).

Colour of surface of shell:	from pale to brownish yellow, in various shades; also tinged greenish sometimes.
Colour of spots:	reddish and blackish brown; underlying spots show through grey.
Average dimensions:	34.5 × 25 millimetres.
Average weight of shell:	0.65 gram.
Texture of shell:	like that of *S. fluviatilis*.
Shape:	varies between pointed oval and pyriform.
Nest and its site:	consists of dry vegetable materials; mostly on floating masses of dead blades of waterplants; on broken-down stalks and blades of previous seasons; on the ground, in wet grassland. (Breeds in colonies).
Number of eggs:	usually 3.
Breeding season:	end of May, June, July; in the beginning of August eggs have sometimes still been found. [1]
Duration of incubation:	about 17 days.

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[1]) See: „De Levende Natuur", IX, p. 137.

a

b

c

d

e

f

Hydrochelidon nigra (L.)

XLIII. Family ANATIDAE.

Family ANATIDAE.

(Plates 181—189).

„Inter omnium avium vero ova Anatidarum „difficillime distingui possunt".

(Dr. A. HANSMANN, Conspectus generalis ovorum avium Europam habitantium. Diss. inaug. Kiliae, MDCCCLX. p. 16).

So far as I have been able to ascertain, DES MURS has up to the present been the only oologist who has examined the pigmentation of the eggshell of *Anatidae* somewhat more closely than only at the surface.

Where, however, that author states: [1]) „La couleur est superposée „à la surface de la coquille dont la composition interne n'en emprunte „rien ou que fort peu de chose", I have ascertained, as will be seen from what is subjoined, that when examining the shell he remained very near the surface; and that VON KÖNIG-WARTHAUSEN's assertion [2]): „Bei den *Anatiden* liegt die Färbung gewöhnlich nur in „einem schleimigen Ueberzug" (which I call *glutinous layer*) is incorrect.

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[1]) O. DES MURS, Traité général d'Oologie ornithologique. Paris, 1860, p. 457.

[2]) DR. BARON R. VON KÖNIG-WARTHAUSEN, Ueber die zur Unterscheidung der Vogeleier dienenden Merkmale, in: Württemb. naturw. Jahreshefte, 1876, p. 180, note.

Indeed, the examination which I made of the shells of the species which come into consideration here, brought the following particulars respecting the pigmentation to light:

TADORNA TADORNA (L.).

The chalk shell underlying the *cream coloured* glutinous layer is *white* to the inner membrane.

SPATULA CLYPEATA (L.).

Greenish: the chalk shell underlying the glutinous layer is coloured *bluish green* at the surface; the intensity of colour diminishing gradually towards the inner membrane.

Yellowish: the chalk shell underlying the glutinous layer is *cream coloured* to the inner membrane.

ANAS BOSCHAS L.

Greenish: the chalk shell underlying the glutinous layer is coloured *bluish green* at the surface, gradually changing into *sea green* to the inner membrane.

Yellowish or brownish yellow: the glutinous layer is coloured dirty yellow or brownish yellow; the immediately underlying chalk layer is coloured *bluish green*, and the fundamental layer (superposed on the inner membrane) is coloured *sea green;* between the two lies a layer of a *deep cream colour.*

Whitish: in this shell oocyanin is absent from the chalk pigment-layer immediately underlying the glutinous layer, or it occurs therein in so slight a quantity as not to show through on the outside.

CHAULELASMUS STREPERA (L.).

Greenish: the chalk layer lying immediately under the almost colourless glutinous layer is tinged *bluish green;* under it lies a layer which is tinged *faintly yellowish* and which merges into *white* towards the inner membrane (the fundamental layer is *not* coloured green).

Yellowish: the chalk layer lying immediately under the dirty-yellowish tinted glutinous layer is tinged *extremely faintly sea green;* under it follows a *cream coloured* layer which, as in the case of greenish eggs, merges into *white* towards the inner membrane (the fundamental is *not* coloured green).

NETTION CRECCA (L.).

The chalk shell underlying the yellowish tinted glutinous layer is *cream coloured* to the inner membrane (green is not noticeable in any of the chalk layers).

QUERQUEDULA QUERQUEDULA (L.).

Yellowish: the chalk layer lying immediately under the dirty-yellowish tinted glutinous layer, is tinged *almost imperceptibly with bluish white;* under it, all the layers, down to the inner membrane, are *cream coloured.*

Greenish: the uppermost chalk layer is of a *distinct bluish green* colour; for the rest, as in the case of yellowish eggs.

AYTHIA FERINA (L.).

The chalk layer lying immediately under the more or less dirty-yellowish tinted glutinous layer is of a *light sea green* colour; the next layer has a *greyish* tint, whilst the fundamental layer is coloured *sea green.*

FULIGULA FULIGULA (L.).

The chalk layer lying immediately under the glutinous layer is coloured *sea green;* under it follows a *yellowish* layer that is distinctly tinged with *soft pink;* the fundamental layer is coloured *sea green.*

SOMATERIA MOLLISSIMA (L.).

The chalk layer immediately underlying the more or less yellowish tinted glutinous layer, is coloured *sea green;* the next layers under it, down to the inner membrane, are *greyish white* with a *very faint greenish tinge.*

In all the eggshells of the above mentioned *Anatidae* that I examined, with the exception only of *Somateria mollissima,* which thereby shows an oological relationship to *Anseridae,* I observed that the chalk layer immediately underlying the glutinous layer is much more strongly glossy than the glutinous layer itself; in other words: it is more glossy than the exterior surface of the eggshell.

The peculiar smooth, soapy as it were, character of the exterior of the eggshells of all *Anatidae* is no doubt caused by the little drops of *grease* with which — according to LANDOIS's investigations [1]) — the glutinous layer (*Oberhautschicht*) is impregnated.

[1]) See: Dr. R. BLASIUS, Ueber die Bildung, Struetur und systematische Bedeutung der Eischaale der Vögel (Inaug. Diss. Göttingen). Leipzig, 1867, p. 19.

Family ANATIDAE.

Tadorna tadorna (L.) — Common Sheld-Duck.

(Plate 181, fig. a-b).

(Snouckaert: Avifauna Neerlandica, p. 124, No. 296).

Colour of surface of shell:	more or less creamy white; yellowish with a faint reddish tinge.
Average dimensions:	66 × 47 millimetres.
Average weight of shell:	about 8 grams.
Texture of shell:	fine and smooth.
Shape:	as a rule oval.
Nest:	consists mainly of down, with some vegetable material as bedding.
Down:	light pearl grey.
Small feathers:	white; topped broadly black or reddish brown.
Site of nest:	in rabbit burrows; among sand-elymus grass, under dune-thorns, etc.; also in artificial burrows made for the purpose.
Number of eggs:	usually 7—10 (sometimes more).
Breeding season:	May, June.
Duration of incubation:	about 28 days.

Family ANATIDAE.

Spatula clypeata (L.) — Shoveller.

(Plate 182, fig. a—e).

(Snouckaert: Avifauna Neerlandica, p. 124, No. 297).

Colour of surface of shell:	ranges from pale yellowish white to pale greenish yellow.
Average dimensions:	53 × 37 millimetres.
Average weight of shell:	about 3 grams.
Texture of shell:	fine and smooth.
Shape:	mostly elliptical or short ovoidal.
Nest:	composed of vegetable materials and down.
Down (in bulk):	dark sooty-brown, with numerous greyish white spots.
Small feathers:	yellowish, with a blackish brown central spot which does not reach to the top; white at the base.
Site of nest:	on the ground among tall grass and heath-shrubs; among reeds; in dune-valleys, etc.
Number of eggs:	7—10 (sometimes more).
Breeding season:	May, June.
Duration of incubation:	about 27 days.

Family ANATIDAE.

Anas boschas L. — Mallard.

(Plate 183, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 125, No. 298).

Colour of surface of shell:	whitish green, inclining sometimes more to white, and sometimes to green; yellowish, occasionally tinged more or less brownish.
Average dimensions:	56 × 41 millimetres.
Average weight of shell:	about 4 grams.
Texture of shell:	fine and smooth.
Shape:	elliptical or compressed ovoidal.
Nest:	composed of vegetable materials, lined with down.
Down (in bulk):	dark brown, with greyish white spots here and there.
Small feathers:	base and top white; between the two: pale brown.
Site of nest:	on the ground among grass; on heaths under shrubs; among reeds in pools; also sometimes on pollard willows.
Number of eggs:	usually 8—12 (sometimes more).
Breeding season:	March until in June.
Duration of incubation:	about 27 days.

Family ANATIDAE.

Chaulelasmus strepera (L.) — Gadwall.

(Plate 184, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 126, No. 302). [1])

Colour of surface of shell:	ranges from yellowish to pale greyish green. *Certain authors wrongly assert that a greenish tint never occurs in these eggs.*
Average dimensions:	54 × 37.5 millimetres.
Average weight of shell:	about 4 grams.
Texture of shell:	fine and smooth; to the aided eye it appears still more finely granulated than that of *A. boschas*, to which, for the rest, *Ch. strepera* is closely allied oologically.
Shape:	usually blunt oval; sometimes elliptical.
Nest:	consist of vegetable materials, lined with down; it is lined with down more abundantly than that of *A. boschas.*
Down (in bulk):	dark brownish grey, with small lighter centra, topped with grey.
Small feathers:	white at the base, spotted dark irregularly in the centrum, lighter towards the top.
Site of nest:	on the ground, among grass, sedge, etc.
Number of eggs:	usually 7—10 (sometimes more).
Breeding season:	May, June.
Duration of incubation:	about 27 days.

[1]) See also Dr. E. D. VAN OORT'S communication in the: „Jaarboekje der Ned. Ornithol. Ver." No. 8, p. 26.

Family ANATIDAE.

Nettion crecca (L.) — Teal.

(Plate 185, fig. a-b).

(Snouckaert: Avifauna Neerlandica, p. 125, No. 299).

Colour of surface of shell:	ranges from cream colour to pale brownish yellow, frequently with a greenish tint. Usually more yellowish than that of *Q. querquedula*. (See subjoined remarks).*
Average dimensions:	44.5 × 32.5 millimetres.
Average weight of shell:	about 1.8 gram.
Texture of shell:	fine and smooth.
Shape:	usually elliptical; sometimes oval.
Nest:	consists of vegetable materials, lined with down.
Down (in bulk):	dark brown (darker than that of *Q. querquedula*), with numerous dull white spots.
Small feathers:	light yellowish, with broad dark spots extending almost to the top.
Site of nest:	on the ground among reeds, sedge, heather, etc.
Number of eggs:	usually 8—10 (sometimes more).
Breeding season:	May.
Duration of incubation:	about 25 days.
***Remarks:**	*N. crecca* and *Q. querquedula* are particularly closely allied oologically. HANTZSCH [1]) even goes so far as to say of *N. crecca*, without any exception: „Die Eier sind von solchen „von *Querquedula querquedula*, weder in „frischem, noch ausgeblasenem Zustande „mit Sicherheit zu unterscheiden. Die Fär„bung is durchaus nicht maszgebend. Ob„wohl häufig lebhaft gelbliche Exemplare „vorkommen, variiert der Ton sogar in „demselben, sicher von einem Weibchen „herrührenden Gelege bis zum ausgespro„chenen Grünlich. Solche Exemplare fand „ich besonders zart und dünnschalig".

[1]) Beitrag zur Kenntnis der Vogelwelt Islands (Berlin, 1905), p. 178.

Family ANATIDAE.

Querquedula querquedula (L.) — Garganey.

(Plate 186, fig. a-c).

(Snouckaert: Avifauna Neerlandica, p. 126, No. 300).

Colour of surface of shell:	creamy white, in various shades; sometimes tinged pale greenish; often with a brownish haze.
Average dimensions:	45 · 32 millimetres.
Average weight of shell:	about 2 grams.
Texture of shell:	fine and smooth; finer than in *N. crecca*.
Shape:	usually elliptical.
Nest:	consists of vegetable materials and down.
Down:	dull sooty-brown, topped with clear white (smaller than that of *N. crecca*).
Small feathers:	light grey, with dark central spots which do not extend either to the top or to the edge.
Site of nest:	on the ground among reeds, hedges, etc.
Number of eggs:	as a rule 8—12.
Breeding season:	end of April, May.
Duration of incubation:	about 25 days.

Family ANATIDAE.

Aythia ferina (L.) — Common Pochard. [1]

(Plate 187, fig. a—b).

(Snouckaert: Avifauna Neerlandica, p. 128. No. 306).

Colour of surface of shell:	greenish drab (hazel coloured); greyish green.
Average dimensions:	62 × 44 millimetres.
Average weight of shell:	6.5 grams.
Texture of shell:	fine and smooth.
Shape:	usually oval, often bellied; sometimes elliptical; rounded off abruptly at both ends.
Nest:	consists of vegetable materials, lined with down.
Down:	brownish grey (particularly soft).
Small feathers:	brownish, faintly striped from the centre in an upward direction, a small part of the top being often coloured grey.
Site of nest:	in marshy regions on dense tufts of sedge.
Number of eggs:	as a rule 8—10 (sometimes more).
Breeding season:	May.
Duration of incubation:	about 27 days.

[1]) For biological particulars of this species see especially the important article by Mr. TJEERD DE VRIES GZN. in: „Verslagen en Mededeelingen der Nederlandsche Ornithologische Vereeniging", No. 4, p. 13 et seq.

a b

Tadorna tadorna (L.)

Fam. ANATIDAE.

a b c

Spatula clypeata (L.)

Fam. ANATIDAE.

a b

c

Anas boschas L.

Fam. ANATIDAE.

a

b

c

Chaulelasmus strepera (L.)

Fam. ANATIDAE.

a

b

Nettion crecca (L.)

Fam. ANATIDAE.

a b

c

Querquedula querquedula (L.)

a b

Aythia ferina (L.)

a

b

Fuligula fuligula (L.)

Family ANATIDAE.

Fuligula fuligula (L.) — Tufted Duck.

(Plate 188, fig. a—b).

(Snouckaert: Avifauna Neerlandica, p. 129, N°. 308). [1])

Colour of surface of shell:	yellowish drab, with a faint reddish tinge, or greyish green; the *reddish* tinge is often clearly noticeable particularly at the pointed end. (See the remarks respecting this species in the general review of the Family).
Average dimensions:	59 × 41 millimetres.
Average weight of shell:	4.5 grams.
Texture of shell:	slightly less fine and smooth than in the case of *A. ferina.*
Shape:	usually elongated oval.
Nest:	consists of vegetable materials, lined with down.
Down:	greyish black, with a but slightly pronounced lighter centrum.
Small feathers:	white with greyish centrum or broadly brown topped.
Site of nest:	in dense bog vegetation among reeds, hedges, etc. [2]); among the grass on ridges. [3])
Number of eggs:	8—12 (sometimes more).
Breeding season:	end of May, June, beginning of July.
Duration of incubation:	about 25 days.

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[1]) See also the communication about this species by Dr. E. D. VAN OORT in: Jaarboekje der Ned Ornithol. Ver. No. 8, pp. 27/28.

[2]) See: de Zomervogels van de Meer te Vlijmen (N. Brabant), by A. B. WIGMAN, in: Jaarboekje der Ned. Ornithol. Ver. No. 7, pp. 84 and 87.

[3]) On June 2nd, 1909, Mr. L. DE VRIES found near Nederhorst den Berg (North Holland) a nest with 3 eggs in an advanced state of incubation, lying on a ridge or little dike, at a distance of about one Metre on one side, and of about two Metres on the other side, from the water. (See: Ornithologie van Nederland, by Baron R. SNOUCKAERT VAN SCHAUBURG, in: Jaarboekje der Ned. Ornithol. Ver. No. 7, p. 55).

Family ANATIDAE.

Somateria mollissima (L.) — Eider Duck.

(Plate 189, fig. a—b).

(Snouckaert: Avifauna Neerlandica, p. 131, No. 313).

Colour of surface of shell:	greyish green or greyish yellow, in various shades; the shell often has dark-green oily spots, and is frequently also covered with green cloudlets as a consequence of an unusual distribution of the pigment. [1])
Average dimensions:	78 × 51.5 millimetres.
Average weight of shell:	about 9 grams.
Texture of shell:	fine and smooth.
Shape:	varies from roundish to pointed elongated oval.
Nest:	consists of vegetable materials, lined with down.
Down (in bulk):	brownish grey, with numerous dull white spots.
Small feathers:	greyish white, becoming lighter towards the base; the centrum with dark brown bands; the top portion brownish yellow with dark spots.
Site of nest:	among sand-elymus plants.
Number of eggs:	4—7.
Breeding season:	May, June.
Duration of incubation:	about 28 days.

[1]) In the case of green eggs of *Anas domestica* this sometimes causes such peculiar deviations as to make the pigment seem to have been applied artificially as it were.

a b

Somateria mollissima (L.)

XLIV. Family COLYMBIDAE.

Family COLYMBIDAE.

Podiceps cristatus (L.) — Great Crested Grebe.

(Plate 190, fig. a—b).

(Snouckaert: Avifauna Neerlandica, p. 137, No. 328).

Colour of surface of shell:	the shell proper is pale greenish blue, but is covered with a chalky, white layer which gradually assumes a colour ranging from yellow to dark brown;* when light penetrates through it, it shows through deep bluish green. The chalky layer adheres in the case of eggs of the genus *Podiceps* much more closely to the shell proper than, e.g., in the case of *Phalacrocorax carbo*.
Average dimensions:	54 × 36 millimetres.
Average weight of shell:	about 4 grams.
Texture of shell:	the shell proper is fine and smoothly granulated.
Shape:	elongated, bi-conical, or rounded at both ends, and more or less bellied.
Nest:	consists of vegetable materials.
Site of nest:	by the edge of lakes, reed-pools, etc.
Number of eggs:	3—5, mostly 4.
Breeding season:	May—June.
Duration of incubation:	about 3 weeks.
***Remarks:**	According to BAEDEKER [1]), the eggs assume a yellow colour on soil containing iron-ochre; a greyish brown or blackish colour on peat soil.

[1]) Die Eier der europäischen Vögel, I (text after Plate 16, 1).

Family COLYMBIDAE.

Podiceps fluviatilis (Tunstall) — Little Grebe.

(Plate 191, fig. a—e).

(Snouckaert: Avifauna Neerlandica, p. 139, No. 332).

Colour of surface of shell:	like that of *P. cristatus*.
Average dimensions:	37.5 × 26 millimetres.
Average weight of shell:	about 1.2 gram.
Texture of shell:	like that of *P. cristatus*.
Shape:	„ „ „ „ „
Nest:	„ „ „ „ „
Site of nest:	in ditches, by the edge of lakes, etc.
Number of eggs:	3—6 (sometimes more).
Breeding season:	April, May, June, July.
Duration of incubation:	about 3 weeks.

Fam. COLYMBIDAE.

a

b

Podiceps cristatus (L.)

Fam. COLYMBIDAE.

a

b

c

Podiceps fluviatilis (Tunstall).

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ALPHABETICAL INDEX

OF THE

ENGLISH NAMES OF THE SPECIES.

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ADDENDA AND CORRIGENDA.

Garrulus glandarius (L.) — Jay.

Please insert in the text (facing plate 6) after:
Site of nest: also sometimes in shrubs.

Emberiza hortulana L. — Ortolan.

Please insert in the text (facing plate 25) after:
Site of nest: according to Mr. P. HENS, this species likes to build ist nest in young fir trees. (See: Versl. en Med. der Ned. Orn. Ver. No. 4, p. 27).

XV. Fam.: **Sylviidae.**

The following sentence occurring in the general view under the heading:
Acrocephalus strepera (Vieillot), should run:
THIENEMANN held *strepera* and *palustris* to be *two forms* of one species, etc.

Aëdon luscinia (L.) — Nightingale.

In the first footnote (facing plate 71) the words: „in a coniferous tree", hould be replaced by: in a tangle of dead and live honeysuckle-branches, which had climbed to that height in an alder. Mr. DE MEYERE found it in a coniferous tree at about $^3/_4$ Metre.

ADDENDA AND CORRIGENDA.

Apus apus (L.) — Swift.

The words in the text (facing plate 91) after:
Shape, should run: elongated; sometimes rounded at both ends.

Athene noctua (Scopoli) — Little Owl.

Please add in the text (facing plate 95) after:
Shape: sometimes one of the ends is more or less pointed.

Oedicnemus oedicnemus (L.) — Stone-Curlew.

The words in the text (facing plate 134) after:
Breeding season, should run: end of April, May, June, beginning of July.
Duration of incubation: about 3 weeks.

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